30

MAY 17, 1954

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

A PROGRAM FOR MANAGEMENT IN 1954

No. 4 in 1954 Management Series

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Stabilizing Production and Employment

Always a knotty management problem, it becomes complicated by unions' demand for guaranteed annual wage—page 87

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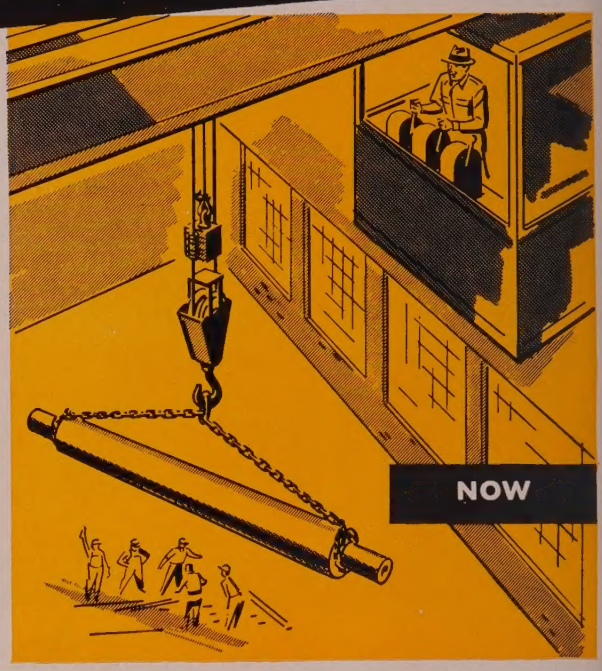
FORGET OVERHOISTING DANGERS!
...WITH EC&M YOUNGSTOWN LIMIT STOPS



Now you can lift loads faster . . . with complete safety. Inexpensive safeguards against overhoisting accidents are EC&M Youngstown Safety Limit Stops which assure a quick, safe stop when the upper limit of travel is reached. The rising hook-block lifts the suspended-weight to operate these Limit Stops and disconnect power from the hoist motor. Should the hoist cables stretch, the tripping point doesn't change.

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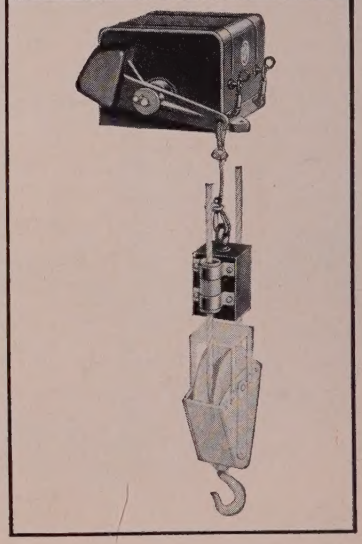

YOU CAN LIFT LOADS HIGHER AND SAFER
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177d

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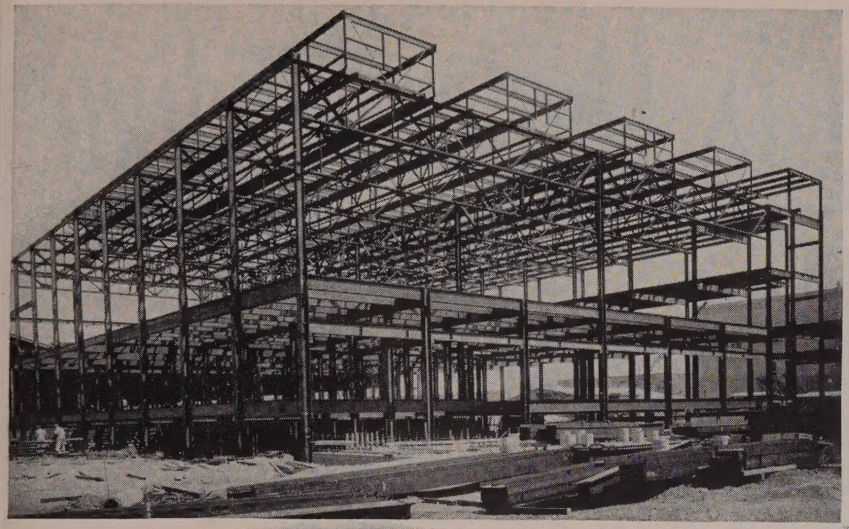
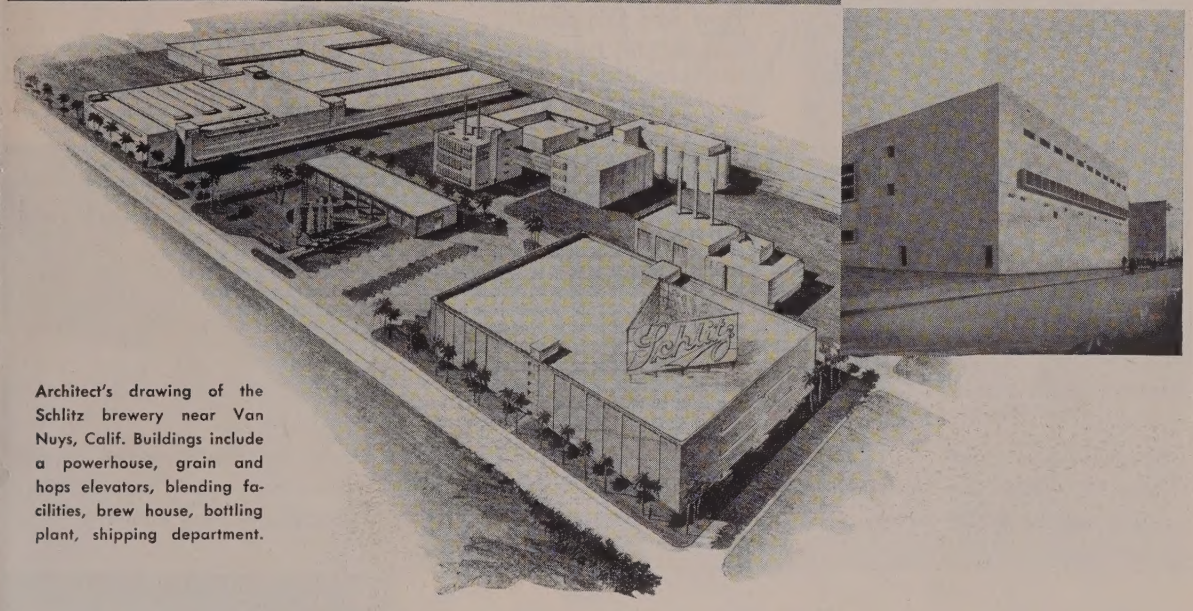


Bottling plant of the new Schlitz Brewing Co. brewery as the steel framework neared completion last fall. *General Contractor:* P. J. Walker Co., Los Angeles. Plans and specifications were prepared by Harley, Ellington and Day, Inc., Detroit. Two Los Angeles firms, Brandow and Johnston and Dames and Moore, were consultants on this project.

Shown almost completed below, the new Schlitz brewery will have an annual apacity of one million barrels.



Architect's drawing of the Schlitz brewery near Van Nuys, Calif. Buildings include a powerhouse, grain and hops elevators, blending facilities, brew house, bottling plant, shipping department.

$20 MILLION SCHLITZ BREWERY IN SOUTHERN CALIFORNIA

The beer that made Milwaukee famous is about to be brewed in sunny Southern California. The new unit, first Schlitz brewery on the West Coast, stands on a 35-acre site in the San Fernando Valley near Van Nuys, just north of Hollywood. It will have an annual capacity of one million barrels.

More than 1700 tons of structural steel for the new brewery was fabricated by Bethlehem Pacific at its Los Angeles Works and erected by Bethlehem Pacific's erection division.

In addition, more than 20,000 high-strength bolts, specified instead of field-driven rivets, were used to make permanent structural connections. Making possible quiet, speedy connections, these bolts are made by Bethlehem Pacific at its Los Angeles bolt and nut plant. The Schlitz buildings are probably the first large structures to be erected in this area with bolted connections.

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Sales Offices: San Francisco, Los Angeles, Portland, Seattle, Spokane

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You'll see how the elimination of flanges and undercuts on the inner ring provides a *wider* contact area for the rollers.

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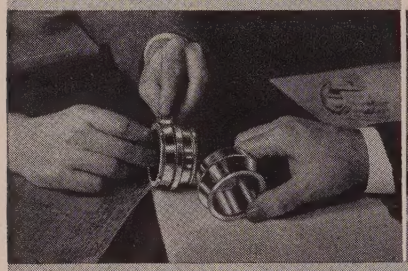
When SKF first announced that its *improved* (Type "C") Spherical Roller Bearing provides, size for size, up to 50% more capacity and 2 to 3½ times longer life than any other available design, most people asked:

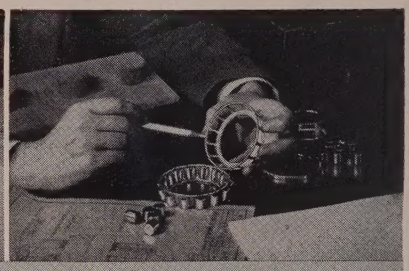
"How was this done?"

Your SKF District Office has the answer, in the form of a clear, quick *visual* demonstration. Ask to see it—here, in outline, is what you'll see!

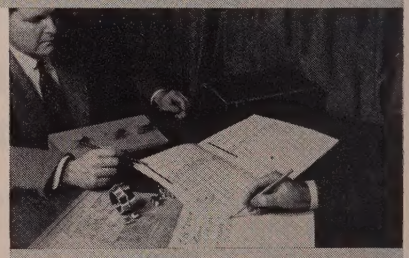


You'll see how much longer the Type "C" Rollers are than those in the original SKF design.

You'll see the way the rollers are *guided* by a separate floating guide ring, free to move axially.



You'll see the improved brass *window-type* cage—see why it's stronger and more effective.



You can see an exact comparison of original vs. Type "C" capacity and life in the sizes of sphericals you use.

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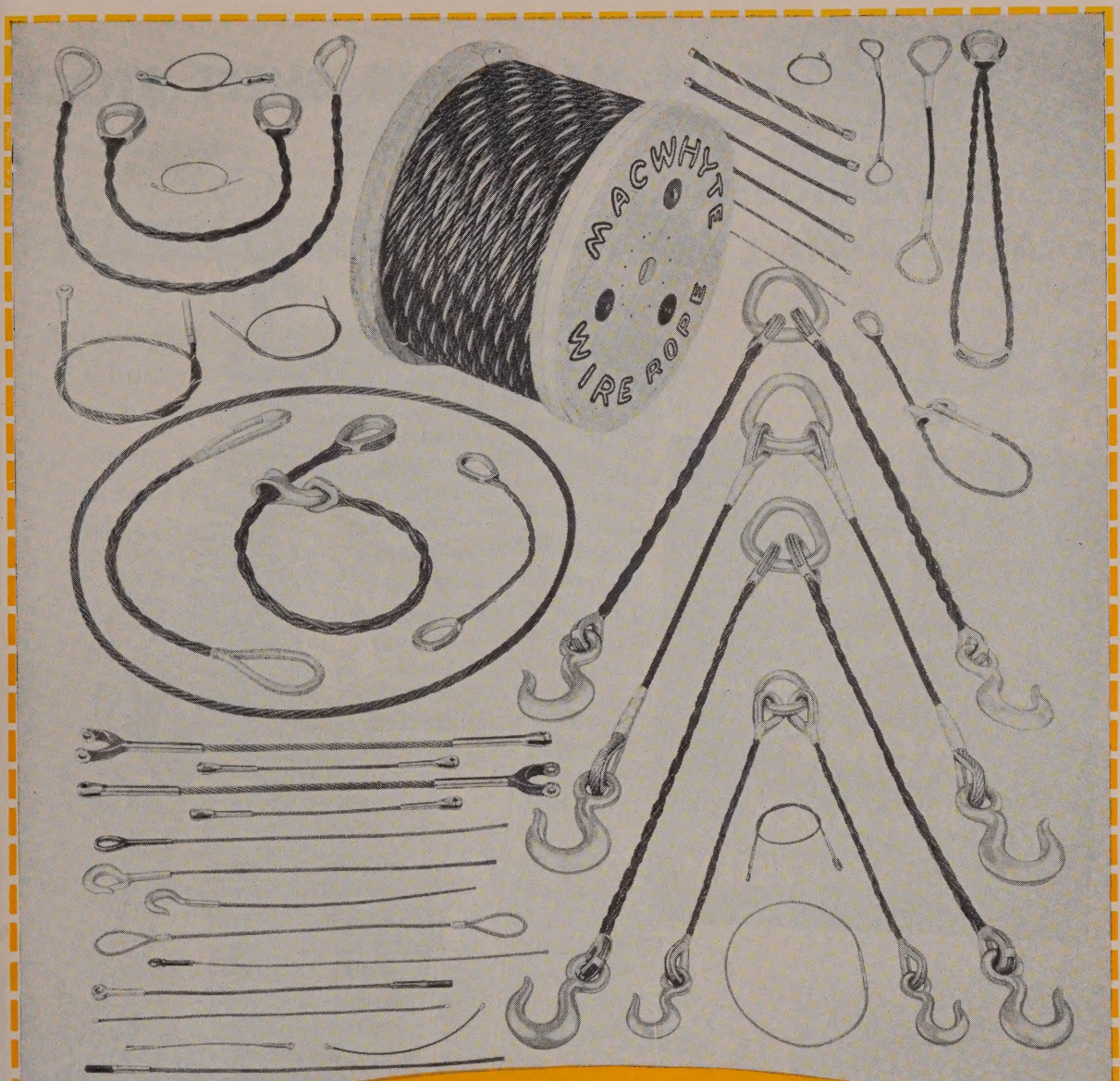

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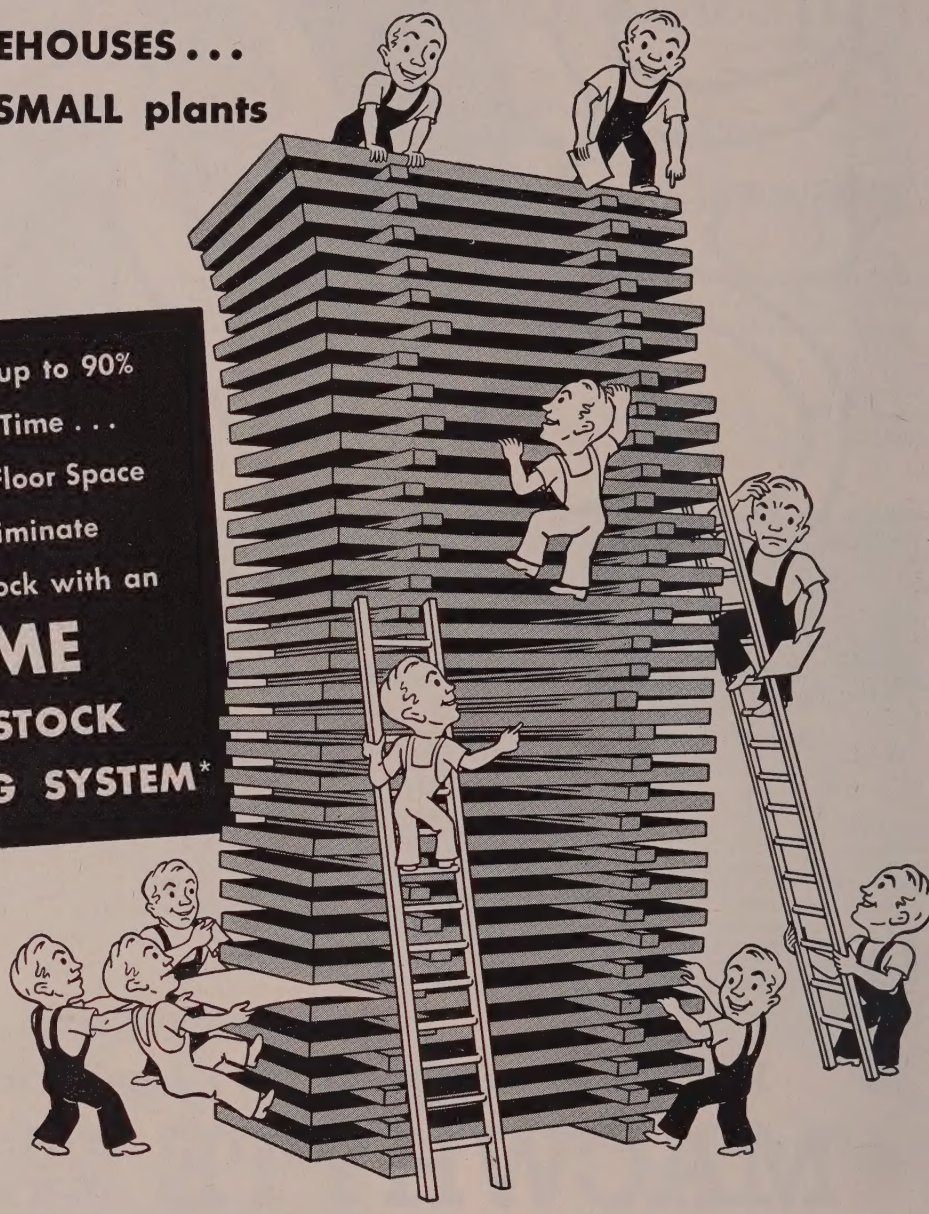

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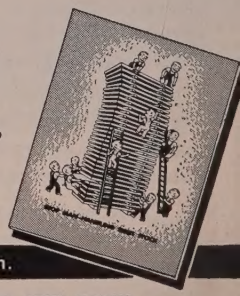

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This Week in Metalworking

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

Vol. 134 No. 20 May 17, 1954

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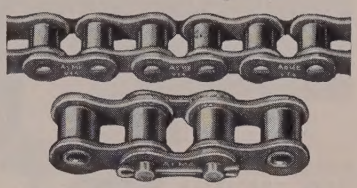

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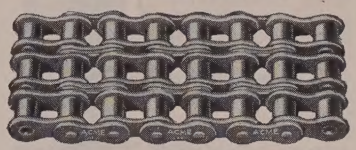
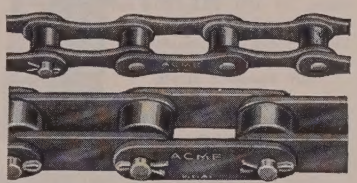
Available in pitches from 3/8" to 2½" riveted and detachable type.



STANDARD MULTIPLE WIDTH
Multiple widths of six strand or wider available for special application.



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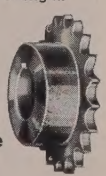

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Write Dept. 10-H for new illustrated 76 page catalog on use and application of roller chains and sprockets.

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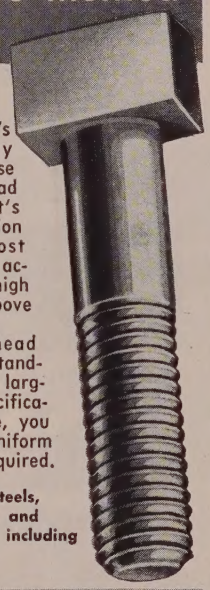
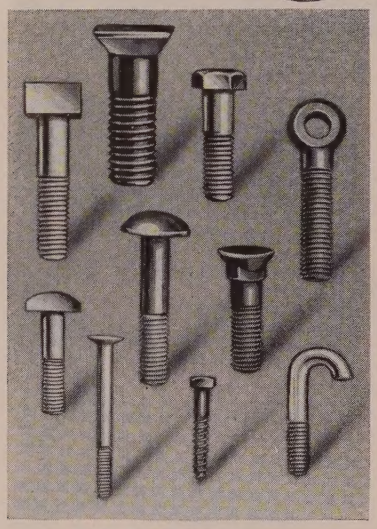
by an
exclusive method



Among Pawtucket's many specialty products are these lower-cost tee-head bolts. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.
Pawtucket tee head bolts are made in standard sizes ¼" and larger, or to your specifications. In any size, you can depend on a uniform Class 3 fit, if required.

All standard steels, stainless steels and non-ferrous metals, including Titanium



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T.M. REG.
"The Bolt Man"

behind the scenes

A Sales Planning Guide

We were playing inquiring reporter down in the Market Research department one day last week when we ran into a king-sized furor named Ladabouche. He's no kin to Liberace . . . just STEEL's market research manager.

Ladabouche was making like an elongated exclamation point. When we asked him "Why all the fuss and fury?" you could almost hear the adrenalin flow. We were then treated to a lucidly beautiful description of the current Ladabouche project which he calls *Metalworking Markets in the United States.*

As we understand it, its the alpha and omega of STEEL's recently completed 1953-54 Metalworking Census all wrapped up and neatly catalogued into a 250-page reference book.

Why It Was Developed

Metalworking Markets in the United States was designed to help metalworking sales management do four things: (1) Establish a workable blueprint for greater sales in a continuously growing industry; (2) recheck sales territories in the light of new census tabulations on a national, state and county basis; (3) channel sales efforts into the areas of greatest sales potential; (4) pinpoint best sales possibilities by products, plants and operations.

What It Contains

When we asked Ladabouche what the book contained, he raised his manual digits and began to count off these specifics: 29 national maps showing concentration of metalworking industry by products manufactured, operations performed and size of plant; 48 state maps, plus one for District of Columbia, detailing plant concentration down to the county level—ideal for working out market areas and sales territories; detailed breakdowns tabulated acording to the Government Standard Industrial Classification code's 2, 3 and 4-digit numbers; 11 graphic charts providing up-to-date analyses of metalworking's growth by employment, plants, sales volume and other useful yardsticks.

But this isn't all. As a whipped cream topping on a very appetizing package, Ladabouche and his department have employed the services of Hagstrom Co. of New York, map-making experts. Together they have come up with an attractive and highly useful 4-color map of the United States picturing the market areas that make up Metalworking America.

How You Can Get Data

By the time our long, lean and likeable raconteur had finished telling us about *Metalworking Markets in the United States* we had picked up a fair portion of his enthusiasm.

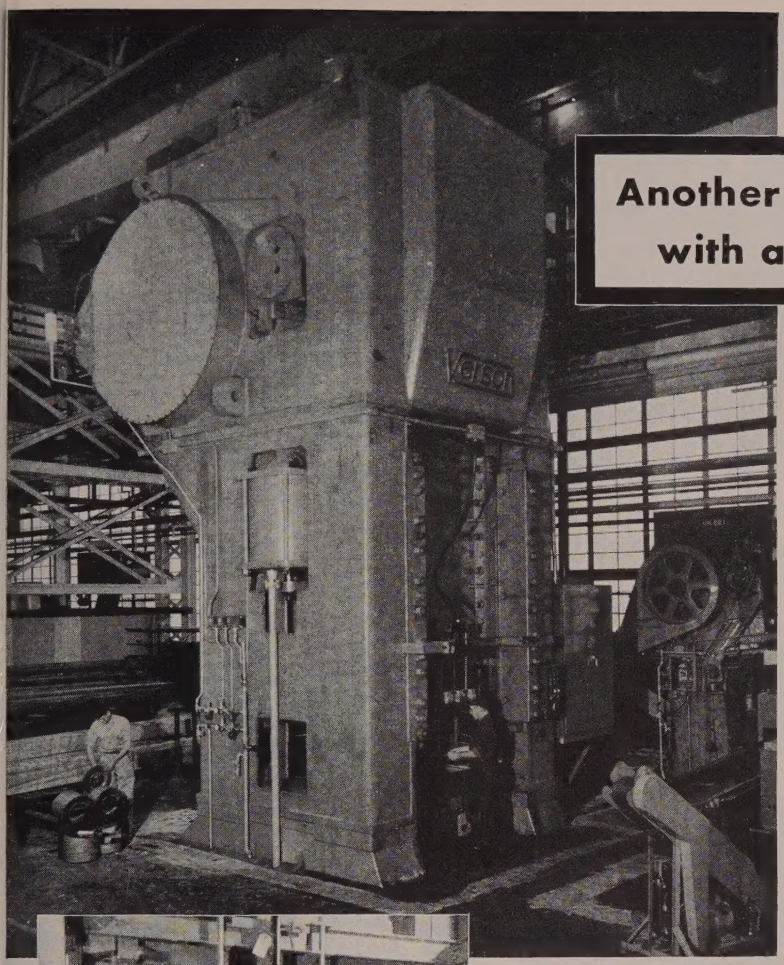
We began to see the multiplicity of uses it could have in the months ahead as metalworking companies hypo their sales departments in an effort to maintain or improve their competitive positions.

We asked Ladabouche how folks like you could get copies of this "once in a blue moon" data. He tells us that the wall map is available to you on request. Also, a twenty-four-page digest of the king-sized reference work titled *U. S. Analysis of Metalworking* can also be had by addressing your requests to STEEL's Market Research department.

Metalworking Markets in the United States will be gladly shown to you by any of STEEL's regional representatives. If you should like to see it, let us know and we'll send one of STEEL's finest to call on you.

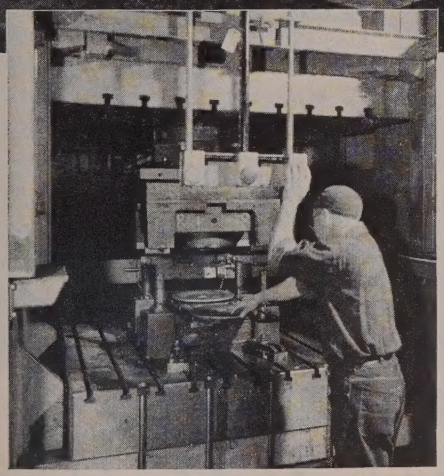
Shrdlu

(Metalworking Outlook—Page 39)



Another job done better with a Verson press

THIS Verson 2500 TON FULL ECCENTRIC PRESS forms automotive flywheels



Close-up of the die space in this 2500 ton Verson Full Eccentric Press showing the part being formed.

If you want to combine the highest standards of accuracy and uniformity in stampings with long, dependable, trouble-free press life, a Verson Full Eccentric Press is the answer. Verson Full Eccentrics incorporate the sum of over thirty years' experience in the manufacture of rugged high strength presses designed to produce better stampings at lower cost.

Such features as the Verson Allsteel Frame . . . the Verson full eccentric drive . . . straight thrust eccentric strap . . . extra long, barrel type, non-oscillating vertical adjusting screw . . . anti-overlap clutch and brake unit put Verson Full Eccentrics in a quality class by themselves.

The press shown above is typical of Verson Full Eccentric Presses. It is being used to form heavy flywheels on a high production basis. Note the long, extra heavy special gibbing and rugged construction throughout—assurance of the accuracy and uniformity required in a part like this.

The Verson Full Eccentric line includes models with one, two and four point suspension in capacities from 100 tons up. Further data is given in Catalog G-52. Write for your copy.

A Verson Press for every job from 60 tons up.

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uniform wall thickness and size
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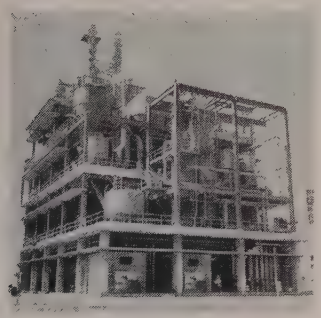
CORN AND RUST DON'T MIX



For solid corrosion prevention and vaporsealing tips write us for a reprint of the "Chemical Processing" article mentioned.

Many are the marvelous products made from corn at the Corn Products Refining Company's Bluebonnet Plant. It, too, like other industries in the area, has maintenance problems, for it is situated on the salty coast of Texas with its corrosive atmosphere. An article in "Chemical Processing" for January 1954 revealed that this plant has met its corrosion problem by coating nearly all steel structures and equipment with INSUL-MASTIC.

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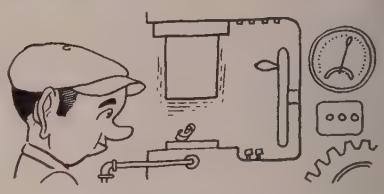
LETTERS
TO THE EDITORS

Get the Right Chip Breaker



We are extremely interested in your article "The Right Chip Breaker—A Metalworking Must" (Apr. 26, p. 98). Can we get 10 tear sheets of this article?

John C. Cox, president
Cox-Ware Corp.
Kirkwood, Mo.

. . . we are particularly interested in your article "The Right Chip Breaker—A Metalworking Must." We would like to obtain several copies.

P. A. Krieg
John Deere Waterloo Tractor Works
Deere Mfg. Co.
Waterloo, Iowa

. . . I would appreciate getting two tear sheets.

J. M. Loiacono
chief metallurgical engineer
Metallurgy & Chemistry Department
Eclipse-Pioneer Division
Bendix Aviation Corp.
Teterboro, N. J.

• *Being sent.—ED.*

The Need for Apprentices

I want to say that your article "Apprentices: Assurance of Skilled Labor Tomorrow" (May 3, p. 65) is certainly a job well done and should convey to the readers in industry something that they haven't done or that they ought to do more of in the future.

I think you have carried enough explanation and statements from various angles that gave a good impression of what apprenticeship is all about and that something should be done to establish apprenticeship.

Since this is a very good article and well written, I would like to have 25 tear sheets of it. I want to send them to our regional and national office for their information.

Oscar R. Poole
area supervisor
Bureau of Apprenticeship
Department of Labor
Cleveland

• *Sent.—ED.*

What Does Galvanizing Mean?

We refer to an article which appeared in STEEL entitled "Galvanizing with a Paint Brush" (Sept. 7, 1953, p. 158). We strenuously object to this type of publicity on the basis that it is misleading.

The heading is sure to catch the

(Please turn to page 12)

right! You don't need buffing with Silver-Lume, the really bright silver
PLATEMANSHIP
PLATEMANSHIP
PLATING & POLISHING PROCESSES EQUIPMENT SUPPLIES

The sparkle on that silver is born in the plating bath, and it's the FIRST and ONLY *really bright* silver plating process. Coverage? H-VW-M's Silver-Lume Process produces a consistently uniform high color through an exceptionally wide current density range. Even deeply recessed pieces like the bowl of a gravy ladle come out of the bath uniformly bright. There's no need for special equipment to plate with Silver-Lume, initial cost is low, savings in buffing costs are considerable —and the whole process is easily controlled, foolproof and time-saving with *consistently* better results.

This exclusive process is just one of many results of over eighty years of constant electroplating development—a continuing policy summed up in H-VW-M Platemanship . . . your working guarantee of the best that industry has to offer—not only in the bright plating of silver—but in every phase of plating and polishing.

8463

Ask for the Technical Instruction Manual on Silver-Lume.

Your H-VW-M combination—of the most modern testing and development laboratory —of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

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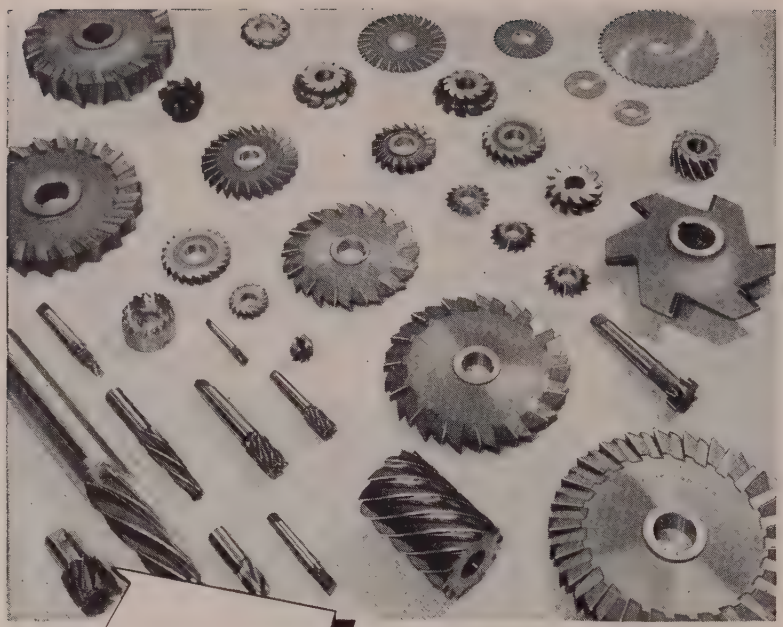
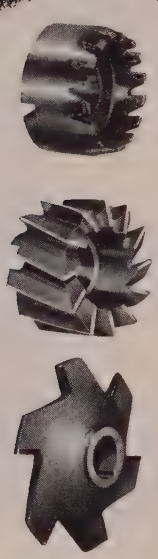
INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES



THE *Complete Line*

GORHAM

END MILLS AND MILLING CUTTERS



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"EVERYTHING IN STANDARD AND SPECIAL CUTTING TOOLS"

14401 WOODROW WILSON • DETROIT 3, MICHIGAN

WEST COAST WAREHOUSE: 576 North Prairie Ave., Hawthorne, Calif.

LETTERS

(Concluded from page 10)

reader's eye, but we feel that you cannot galvanize with paint. Through the years we are pleased that galvanizing is generally accepted to mean hot dip galvanizing.

We feel the headline in question is definitely misleading and creates in the minds of the readers the impression that the paint, ZRC, is equal to or comparable to hot dip galvanizing.

As you know, ZRC is a zinc-rich paint. Zinc-rich paint plays an important role in the battle against corrosion. However, we do not feel that it plays the same role that hot dip galvanizing does.

You may say that it is a credit to hot dip galvanizing that others wish to be compared with it. Naturally we are flattered, but in actual experience such comparisons mean extra work and perhaps the temporary loss of customers who are misled by articles such as the one in question.

Stuart J. Swensson Jr.
assistant secretary
American Hot Dip Galvanizers Association Inc.
Pittsburgh

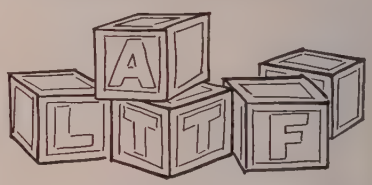
Bubbling with Interest

In the Apr. 26 Letters to the Editors column (p. 12) you mention that you are issuing a reprint of the series of three articles on the pros and cons of leasing and renting industrial equipment (Mar. 29, Apr. 5, and Apr. 12). We would appreciate receiving a copy of this reprint when it is ready.

Charles O. Cary
sales manager
Electronics Division
Curtiss-Wright Corp.
Carlstadt, N. J.

• *Reprints of the series on renting and leasing will be available soon.—ED.*

Broad Education in Steel



Do you know of a textbook which I may purchase or any literature that describes each type of steel and explains how each is produced?

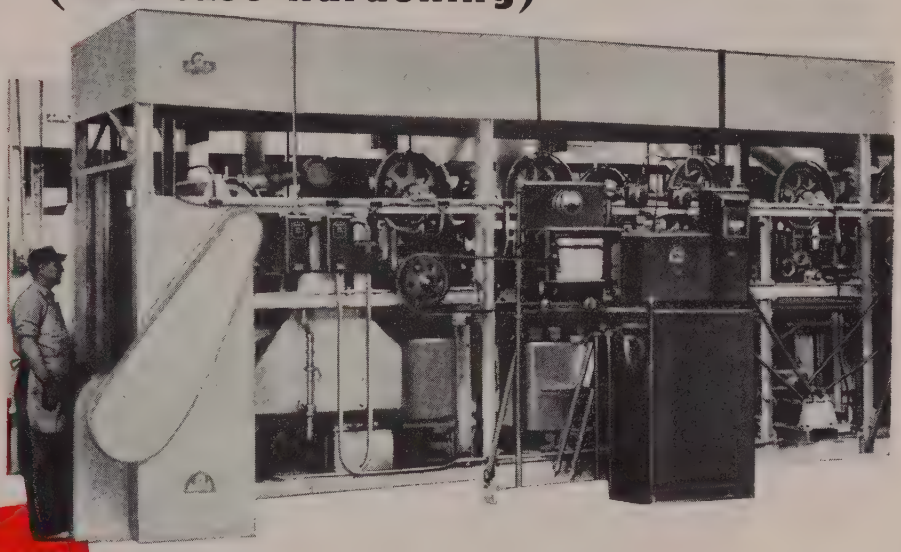
Homer H. Manuel
Material Procurement
General Motors Corp.
Detroit

• *The book, "ABC of Iron and Steel," published by the Penton Publishing Co., is a 400-page book containing many chapters on the various types of steel, such as open-hearth, bessemer, electric, stainless and tool steels. These chapters were written by experts in the various fields of steelmaking. Steel Products Manuals, covering the major forms of steel as sheets, bars, wire, etc., are available from the American Iron & Steel Institute.—ED.*

CUT COSTS WITH THE

Fastest Carburizing

(and case hardening)



Labor Cost Reduced 80%

. . . by these two mechanized lines using Ajax Salt Baths for carburizing compressor parts in plant of prominent manufacturer of electric refrigerators.

More economical . . . is the fastest method of producing a specified case depth—for example, a case of 0.040 in. can readily be produced in 2 hours . . . No boxes or retorts to pack and unpack or to heat as dead loads.

Less distortion . . . temperature uniformity throughout bath guaranteed within 5°F. . . . less subsequent grinding . . . permits more shallow case depths.

Closer control of depth and other properties of the case.

Selective carburizing simplified by immersing only portions of work to be treated.

Eliminates usual reheating operation . . . work quenched directly from carburizing bath.

Extreme flexibility . . . several batches may be case hardened simultaneously—each to a different case depth.

No "oxygenation" of the case, with attendant pitting and spalling, as frequently occurs in gas or pack carburizing.

Readily adaptable to mechanization for efficient, low-cost mass production.

Combines with martempering . . . for best control of distortion . . . by an isothermal salt bath quench directly after carburizing.

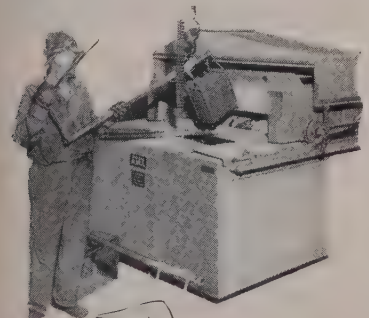
Brazing can be performed simultaneously . . . both carburizing and brazing done with one heating of the work. Brazing cost—nothing.

Low maintenance costs . . . plain steel pots have a life of 1 to 3 years.

390 Lbs. of Work an Hour

. . . from an Ajax furnace no larger than your desk!

180 lbs. of metal body screws per charge are case hardened (0.004" to 0.010") as required.



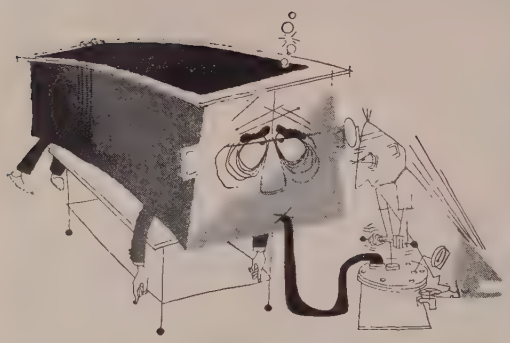
AJAX ELECTRIC COMPANY

952 Frankford Ave. PHILADELPHIA 23, PA.

World's largest manufacturer of electric heat treating furnaces exclusively

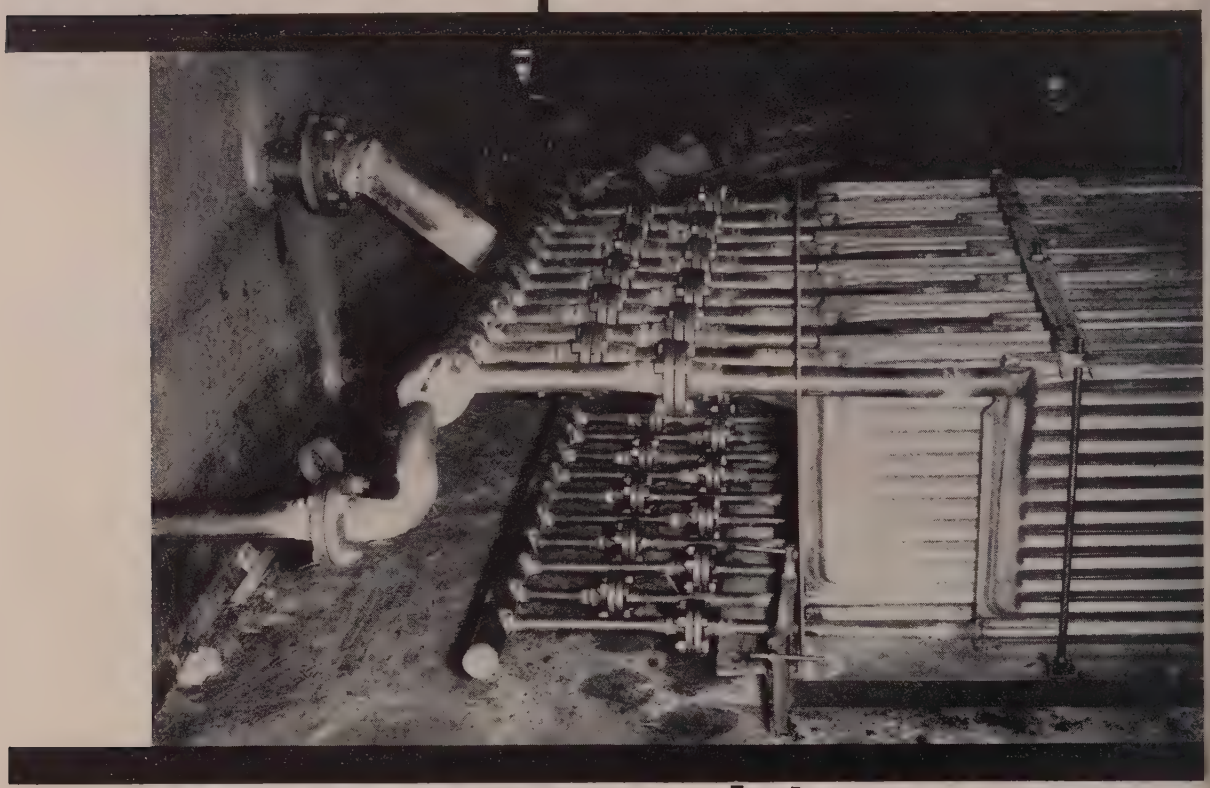
In Canada: Canadian General Electric Co., Ltd., Toronto, Ont.

AJAX ELECTRIC SALT BATH FURNACES



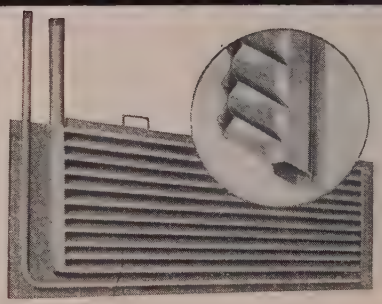
steam costs cut 96% as PLATECOILS *cure coil-itis* *

Old Colony Tar Company cut their steam costs 96% and saved a full week heat-up time per removal by replacing pipe coils with Platecoils in their tar storage tanks. It took a week for the pipe coils to heat a 250,000 gallon tank to pumping temperature . . . now, with the Platecoils, there is no heat-up time required. It cost $100.00 per removal for steam . . . now steam costs have been cut to $4.00 per removal, and $96.00 is saved. This installation is described in detail in Bulletin P72 shown below.



PLATECOILS *replace pipe coils for 50% of the cost*

* Coil-itis is the constant doctoring of wet processing tanks for pipe coil troubles. It can be cured easily by replacing pipe coils with Platecoils. Immediately, you will notice the difference as Platecoils put new life and profits into your heat transfer processes. They heat or cool 50% faster and take 50% less space in the tank. They save as much as 50% in initial cost and 50% in maintenance costs in addition to overcoming the limitations and operating difficulties of old fashioned and outmoded pipe coils.



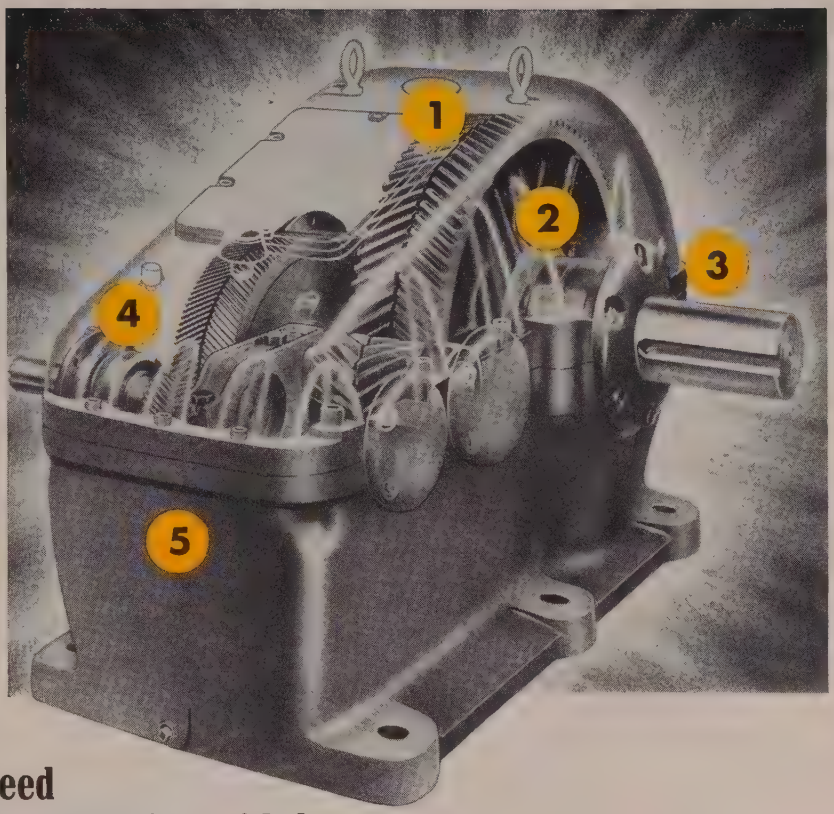
Bulletin P72 shows how Platecoils are replacing pipe coils at a savings throughout industry. Send today for your copy.

Platecoil Division, TRANTER MANUFACTURING, inc., Lansing 4, Michigan

For fast shipment see your local distributor

LINK-BELT PARALLEL SHAFT DRIVES offer 5 big quality extras

1. **GEARS** are precision-shaved. All shafts are rigidly supported to preserve alignment far beyond rated capacity.
2. **ROLLER BEARINGS** are used throughout. Sizes are adequate to handle heavy shock and overhung loads.
3. **GREASE-LUBRICATED SEALS** prevent entrance of dirt and water. Seal housing design provides heavy grease collar for each input and output shaft.
4. **AUTOMATIC SPLASH LUBRICATION** reliably supplies oil to all bearings, gears and pinions at all speeds.
5. **STURDY HOUSING** is designed so all parts can be removed without disturbing base, which can be grouted in concrete.



When you need high-hp speed reduction with heavy shock loads, Link-Belt gives you

everything you want in PARALLEL SHAFT DRIVES

BECAUSE they withstand heavy shock loads, Link-Belt parallel shaft drives are the low-cost answer for many high-hp speed reduction problems. Simultaneous engagement of several teeth assures smooth operation and great load carrying capacity.

What's more, the elimination of power-wasting vibration results in sharply reduced power consumption. Other benefits include quiet operation and increased efficiency.

Link-Belt parallel shaft drives are available in 2.84:1 to 318:1 reduction ratios, ½ to 1000 hp, 2 to 600 output shaft rpm. Ask for Book 2519.

LINK-BELT

ENCLOSED GEAR DRIVES

*3,406

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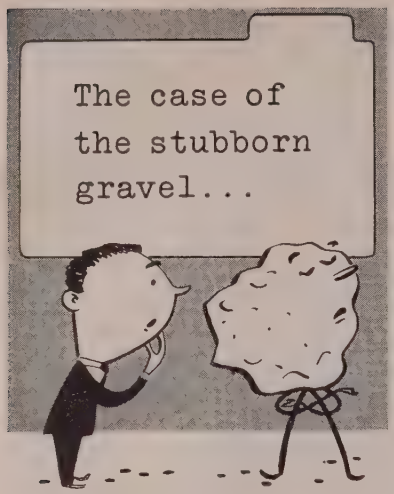
WHY PRE-INTEGRATED LINK-BELT DRIVES CUT YOUR POWER TRANSMISSION COSTS

In addition to all three types of speed reducers, Link-Belt builds variable speed drives, fluid drives, chains, sprockets, couplings, bearings, shafting. All are pre-engineered for easy installation and maximum efficiency.

Worm Gear Drives — ask for Book 2324-A

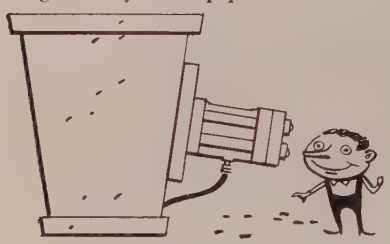
Gearmotors — ask for Book 2247

Helical Gear Drives — ask for Book 2451



Yes, believe it or not, chaos really reigned in this case of a Washington gravel plant . . . all because of a pile of stubborn gravel.

It bridged . . . it arched . . . it plugged . . . and generally tied up production.



After we got the facts on the case, we recommended a CLEVELAND vibrator, and in nothing flat that stubborn gravel was moving continuously and smoothly.

Tell us your materials handling problem, or ask for our detailed literature.

AIR *and* ELECTRIC

2780 Clinton Avenue • Cleveland 13, Ohio

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TIME-SAVING IDEAS

Presented as a service to production men, we hope some of these interesting ideas, chosen from thousands of jobs, will suggest ways to help you cut time and costs in your own work.

MACHINING DIFFERENTIAL CASES ON A FAST, AUTOMATIC BASIS

3 Operations Total 2.4 Minutes

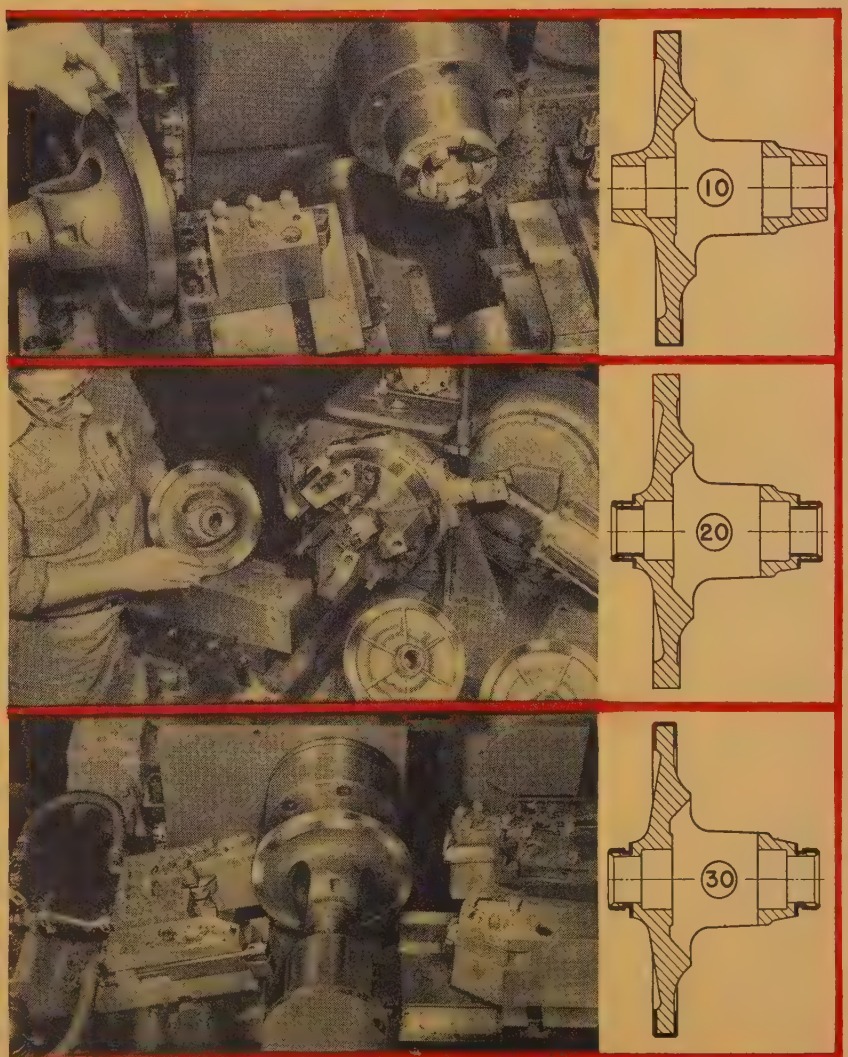
t takes three separate machining perations to turn these castings into nished tractor differential cases. To nake a fast job of it, production is handled by these three No. 12 Hydraulic Automatic Lathes...and ust one man.

st Operation—0.6 Minutes
This rough machining prepares parts or holding and locating in subsequent operations. Bell-type centers in he tailstock and spindle line up hub liameter at each end. Longitudinal ocation is taken care of by a positive top. A single tool on the front carriage turns the flange, while two tools on the rear slide straddle face.

2nd Operation—0.9 Minutes
Part is now held on OD with a Gisholt-Barker air-operated chuck. This chuck leaves the spindle open o carry tools to bore, face, turn and chamfer the hub. Similar tools mounted on the front carriage handle he same surfaces on the other end.

3rd Operation—0.9 Minutes
Workpiece is held back and driven vith an air-operated clamp and a serrated C-washer. Tools on front carriage turn both hubs, as well as inish turn the flange OD and chamfer both corners. Tools on the rear slide form the grinding relief, chamfer both hubs and finish straddle face he flange.

These complex parts, with 16 inside and outside surfaces at both ends, are machined in a rapid, pass-along sequence.



THE AMAZING VERSATILITY of this machine is illustrated by 28 different jobs in the *No. 12 Hydraulic Automatic Lathe* catalog. Write for your copy.

GISHOLT

TIME-SAVING IDEAS

HOW GOOD "HEAD" WORK MAKES THIS A ONE-PASS OPERATION

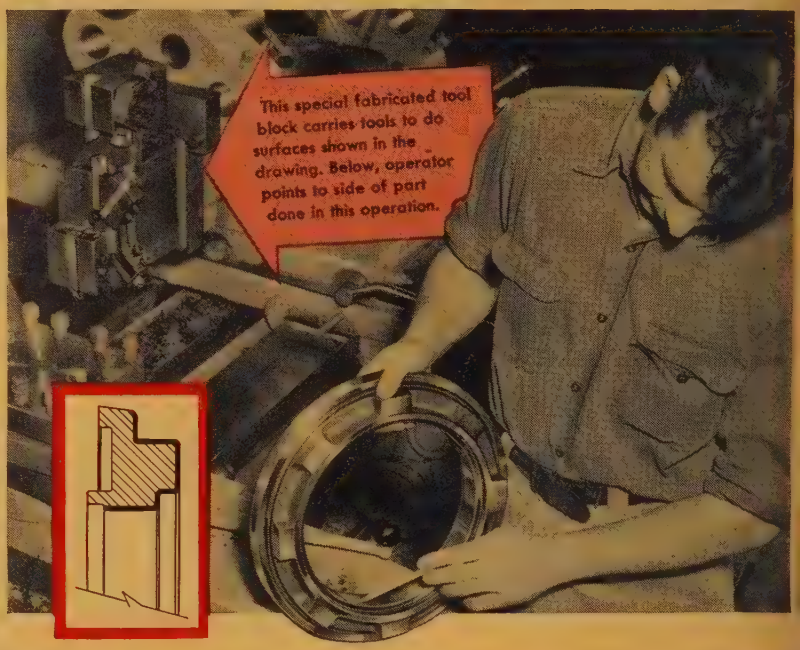
Combined Tooling Saves Time

It's heavy work with plenty of metal to be removed in the machining of these flanged ring steel forgings. So there's 60 horsepower put into the 3L Saddle Type Turret Lathe that does the job.

A newsworthy feature of the setup —and a good point to remember for your own work of this kind—is the massive combination tool holder which carries seven tools. Securely mounted on the hexagon turret, this special head combines tools for plunge cutting the surfaces shown in the drawing in a single pass. Floor-to-floor time is 2.5 minutes, much faster than what it would be with a conventional tooling arrangement.

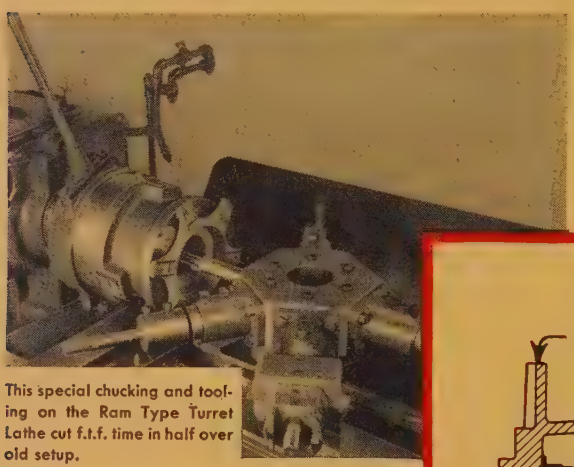
You can be sure that the tools mounted in this strong, fabricated head are there to "stay." There's no overhanging of tools this way, no springing problems. Work of this kind, to do it right...and fast...takes plenty of power and rigidity in a machine. They have it here in the rugged Gisholt 3L Saddle Type Turret Lathe.

By combining 7 tools in one special head, all surfaces are handled in one powerful plunge cutting operation.

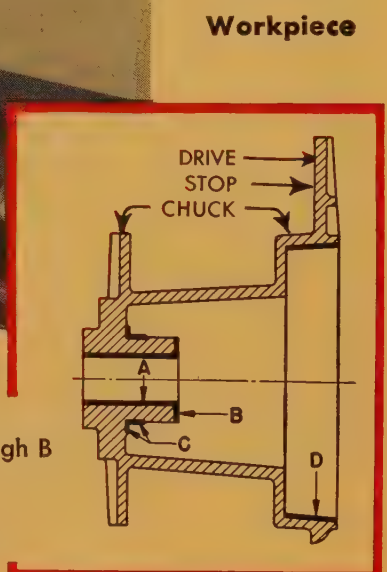

This special fabricated tool block carries tools to do surfaces shown in the drawing. Below, operator points to side of part done in this operation.

CLEVER CHUCKING IDEA HELPS DOUBLE PRODUCTION

Also Assures Concentricity of Long Workpiece



This special chucking and tooling on the Ram Type Turret Lathe cut f.t.f. time in half over old setup.



Station 1—Rough A
Station 2—Finish A, rough B
Station 3—Ream A
Station 4—Rough C-D
Station 5—Finish B-C-D

Here the production trick is holding these cast-iron hub spiders. Because of the long overhang, chucking had to be planned for support at both ends of the workpiece. Yet, fast loading and unloading were a must, too.

All problems are nicely solved by the No. 5 Ram Type Turret Lathe equipped with a 3-jaw Gisholt Barker Wrenchless Chuck. This provides for fast loading operations and yet allows a large enough bore to carry a pilot bushing for added support during boring.

A special fixture locates and drives at the spider end. Chuck jaws, free to move through openings at the back of the housing, hold on the small flange end. Balanced and piloted tools on the hexagon turret handle all the surfaces shown.

Time on this machine with good tooling and chucking is now only 3 minutes—just half the time of the former method.

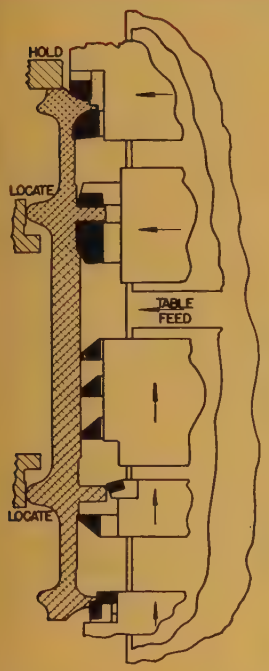
Here, fine, fast chucking with good tooling for rapid stock removal has doubled production.

GISHOLT

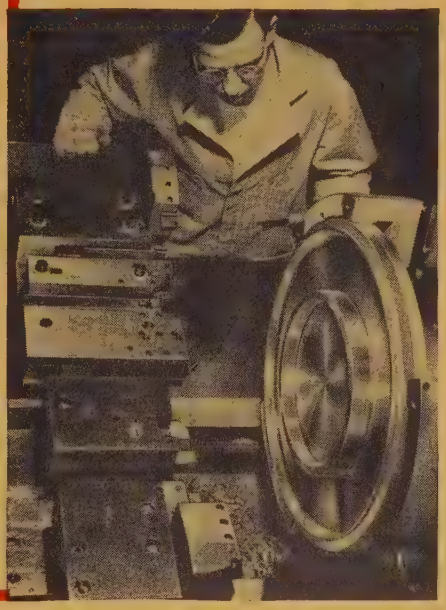
TIME-SAVING IDEAS

MANY SURFACES AND SIZES NO PROBLEM...*THIS WAY*

Simplimatic Provides Automatic Operation on Jet Engine Part



Tool setup and directions of travel.



Setting up this jet engine job had its problems: how to handle the many surfaces of the compressor discs in nine different sizes.

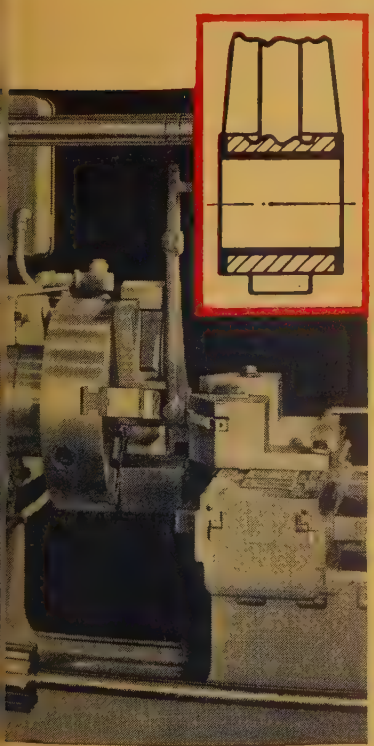
The solution was provided by a Simplimatic Automatic Lathe. Seven tools on the front slide feed longitudinally to depth and then across for facing and turning. Four tools on the rear slide move longitudinally to finish the turning and boring and to form the four radii. A 50-horsepower driving motor is required. Floor-to-floor time is approximately 13 minutes.

The drawing shows how each slide with its group of tools feeds at its own direction and rate of feed. This permits you to get more combinations of surfaces in a single tooling setup. It's the reason why so many different jobs can be handled on the Simplimatic—and at a cost far below that of a special machine.

Nine sizes of similar parts are easily handled by simply repositioning tools in the T-slots using the same slide positions and motions.

GOOD TIPS IN HOLDING AND MACHINING BIG-SWING PARTS

Fastermatic Provides Efficient Production of 18 Similar Workpieces



Close-up shows chucking detail. Front and back faces and the ID are machined in one operation.

There's more here than meets the eye. While the drawing shows simple multiple machining, there are definite problems in holding this part (and seventeen others) having considerable swing.

To do the job in one fast, automatic operation a 1F Fastermatic Automatic Turret Lathe was chosen because of the multiple passes it makes possible. To take care of the big swing, the lathe bed was gapped as shown.

The real problem—of holding the various parts without going into special, expensive fixtures—was solved by a 2-3 jaw convertible chuck. Chucking is done with either two or three jaws, depending upon available chucking surfaces. To get a firm grip on the contoured chucking surfaces, jaw inserts are used.

There is simple turret and cross slide tooling with a back-facing attachment mounted inside the spindle. This permits doing all surfaces from both ends in a single, completely automatic cycle. Floor-to-floor time for a part with an 18" swing is 4.7 minutes. The other seventeen parts are handled just as efficiently.

An unusual job with smart chucking permits machining these awkward, long-armed parts complete in one operation.

GISHOLT

SUPERFINISHER MOUNTS ON GRINDER ...SAVES REFINISHING COSTS

GISHOLT

TIME-SAVING IDEAS

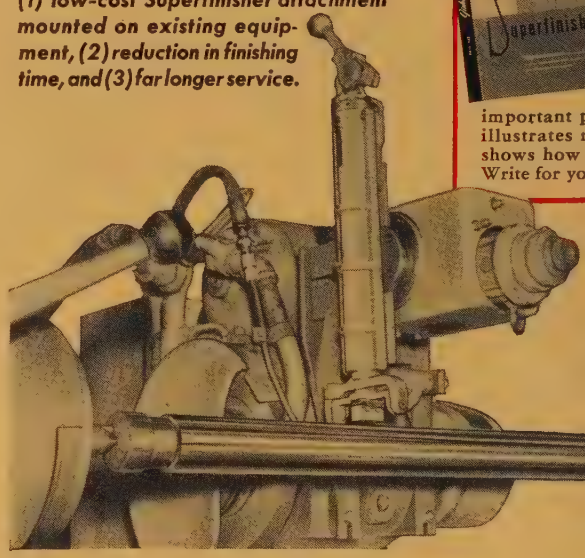
Smooth Surfaces Make Pump Piston Rods Last Longer

Here is a fresh approach to an old problem—rebuilding worn pump piston rods.

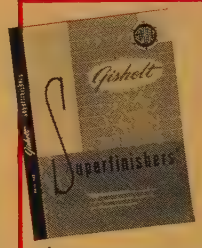
First, the piston rod—from a reciprocating chemical pump—is placed in a grinder. The long shaft is then ground down to the top limit of undersize dimension. At this point, the surface finish measures approximately 15 micro-inches. The grinding wheel is retracted and with a No. 3 Superfinish Attachment mounted on the grinder, the surface is quickly Superfinished down to 5 micro-inches. Work is done in lots of six to ten pieces.

Two important benefits result: finishing time is cut in half with very little cost for new equipment; greatly increased service life is achieved with far less seal replacement.

In this better way of refinishing pump piston rods, money is saved by the (1) low-cost Superfinisher attachment mounted on existing equipment, (2) reduction in finishing time, and (3) far longer service.



Close-up photograph shows Superfinishing attachment mounted on existing equipment. Note long length of shaft.



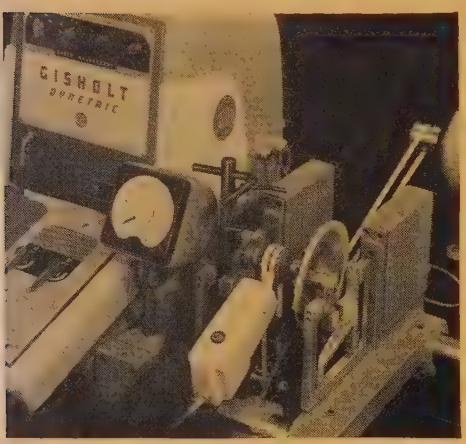
NEW!

YOURS FOR THE ASKING

New Superfinishing Catalog gives clear, concise explanation of this important process; reports on and illustrates numerous applications; shows how time, money are saved. Write for your copy.

HOW "FORCE" UNBALANCE IN ASSEMBLY IS LOCATED AND MEASURED

Correction Made by Addition of Single Weight



Improved 1SB Bench Model Balancing Machine with workpiece loaded.

Precision balancing amounts to a real sales advantage in this case... vacuum cleaners. The manufacturer first dynamically balances the armature and then the armature-impeller assembly. Long life with smooth, quiet operation is the result.

Production is handled on a Gisholt 1SB Bench Model DYNETRIC Balancer. In this case, because the impeller is small in axial length compared in diameter, major unbalance after assembly with the armature will be *force* (static) unbalance, as opposed to *moment* (dynamic) unbalance.

The assembly is placed in a special cradle which permits it to rotate on its own bearing surfaces. Amount of force unbalance is shown on the direct-reading Amount Meter; and angular location is simultaneously indicated on the numbered band by the stroboscopic lamp unit.

Correction of force unbalance requires the addition of a single correction weight. Time in making correction is therefore saved by the Gisholt Balancer because it provides separate measurement of force and moment unbalance. On jobs where moment unbalance stops within an established tolerance for most pieces in the lot, this kind of operation results in even lower balancing costs.

By showing force unbalance separately, correction time is saved by Gisholt Dynetric Balancers.

DYNETRIC BALANCERS GISHOLT

DEVELOPED JOINTLY WITH WESTINGHOUSE ELECTRIC CORPORATION "DYNETRIC" IS A TRADE MARK REG. U. S. PAT. OFFICE BY WESTINGHOUSE ELECTRIC CORPORATION

No. 5-654
625

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

Write for your copy of Gisholt's new general catalog.

GISHOLT MACHINE COMPANY Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

His recommendations and suggestions often result in improved plant operation, increased production efficiency and unit-output with no increase in overhead costs.

The Republic Pig Iron Metallurgist has a solid foundry background gained from years of actual experience. He knows all types of pig irons and their characteristics.

Hundreds of foundrymen regularly keep in touch with the Republic Pig Iron Metallurgist. Why not make it a practice to call him in whenever you need help? There's no cost or obligation for his services.

Let us know when you would like him to call.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
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"CHATEAUGAY"	REPUBLIC	REPUBLIC
Low-Phosphorous, Copper-Free	(Northern) Foundry, Basic and Malleable	(Southern) Foundry and Basic

REPUBLIC STEEL

WIRE BRAID helps put the *punch* in UNCLE SAM'S AIR ARM!

HERE'S the plant that powers new super jets—one of the most powerful jet engines ever released for production!

Look closely and note the broad application of tubular wire braid. It is typical of many types and sizes regularly produced by National-Standard for aircraft service—used not only for electrical shielding, but to reinforce thermocouple harness leads, as shown.

National-Standard with the largest range of wire braiding equipment in the country, is well prepared to supply or develop special braid that will meet your needs *exactly!*

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DIVISIONS OF NATIONAL-STANDARD CO.

ATHENIA STEEL	*Clifton, N. J.*	Flat, High Carbon, Cold Rolled Spring Steel
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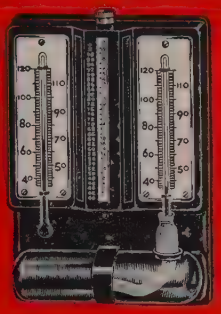
WAGNER LITHO MACHINERY	*Jersey City, N. J.*	Metal Decorating Equipment
WORCESTER WIRE WORKS	*Worcester, Mass.*	Round and Shaped Steel Wire, Small Sizes



IF YOUR WELDING DEPARTMENT
HUMIDITY IS OVER 35%

USUAL ELECTRODE STORAGE PRACTICES WASTE IMPORTANT MONEY!
ONLY PROPERLY CONDITIONED ELECTRODES
CAN PRODUCE QUALITY WELDS

EXCLUSIVELY ARIDAIR

- Dual chemoelectric dehydrators
- Completely ventilated
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- Multiple unit stacking

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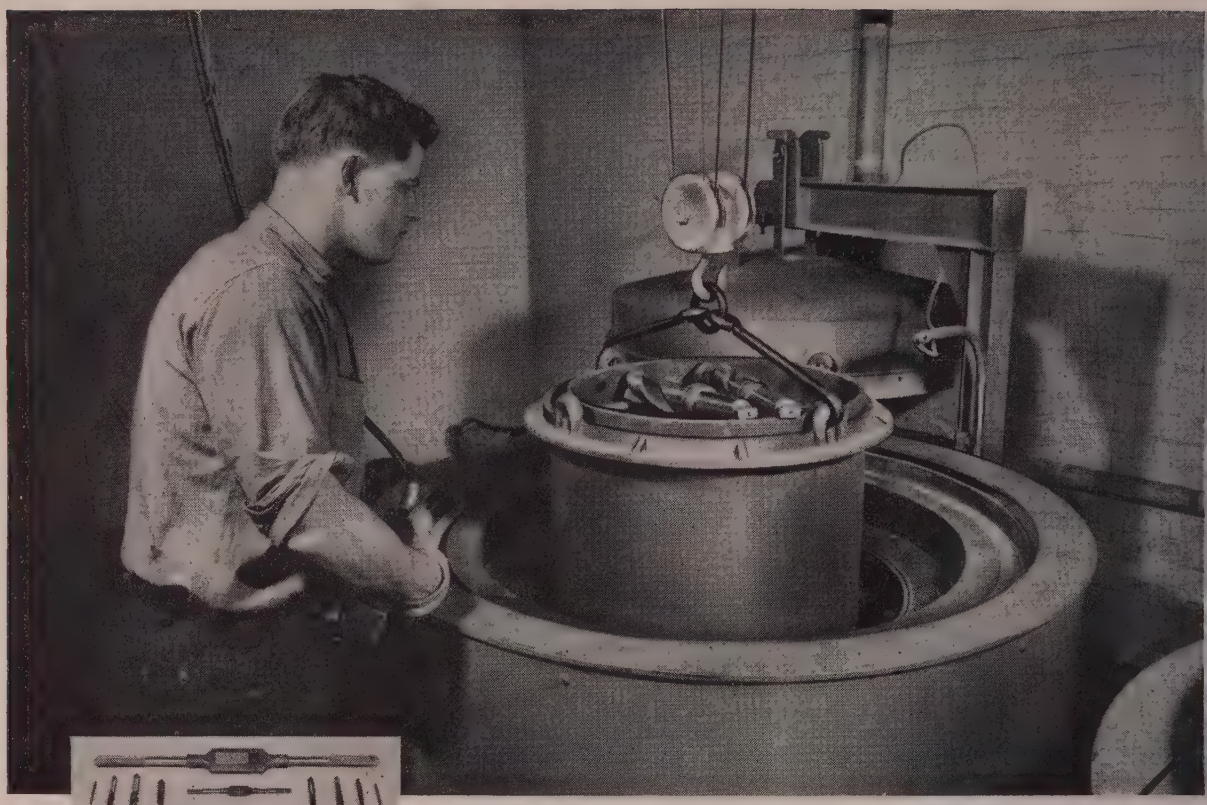
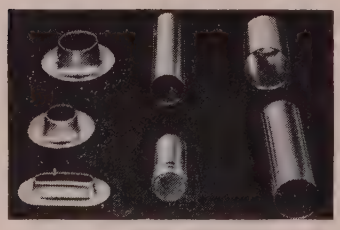


Loads are easily handled in the Steam Homo Furnace.

STEAM ATMOSPHERE HEAT TREATMENT *is becoming standard for many high speed steel cutting tools. It's effective for tools machining average jobs . . . is even better for treating tools handling tough jobs, such as working high-chrome, high-carbon steels.*



COST CUTS OF 53% . . . *in annealing and pickling, effected through steam-atmosphere annealing of these brass stampings.*

For full information about Steam Homo tempering, send for the NEW 12 page catalog, "L&N Steam Homo Method for Heat-Treating". Write our nearest office, or 4957 Stenton Ave., Phila. 44, Pa.

Want Heat-Treating Versatility?

CHECK THESE STEAM HOMO® ADVANTAGES

You get many outstanding heat-treating advantages when you buy the versatile Steam Homo furnace. Here's why:

- Steam Homo gives you scale-free heat-treating of both ferrous and non-ferrous parts at temperatures to 1150 F.

If you're heat-treating ferrous parts:

- The tough oxide film that Steam Homo imparts adds 20–25% more life to high-speed tool steels.
- Steam-treating adds appreciably to the hardness and compressive strength of powdered iron compacts.

Or if you're heat-treating non-ferrous parts:

- Steam atmosphere in many cases eliminates subsequent surface cleaning and pickling operations.

But in both cases you'll get:

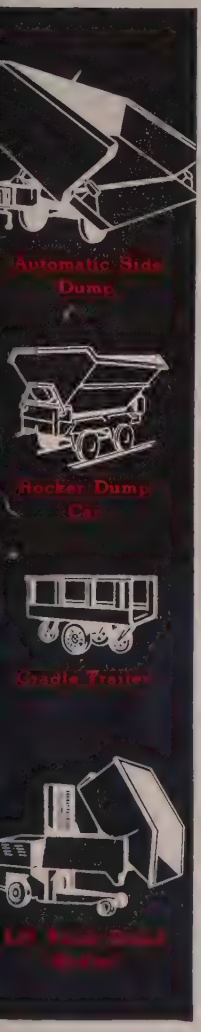
- A compactness which makes the Steam Homo equipment ideal for installation directly in production lines.
- A steam atmosphere heat-treating process which is entirely safe and easy to follow.

Standard Steam Homo furnaces are made in a variety of sizes . . . from those with work spaces as small as 11½″ x 15″ to those as large as 28″ x 60″. All are supplied as assembled units, ready for installation.

LEEDS [N] **NORTHRUP**

instruments *automatic controls* • *furnaces*

EASTON simplified production and improved product with this CINCINNATI Press Brake



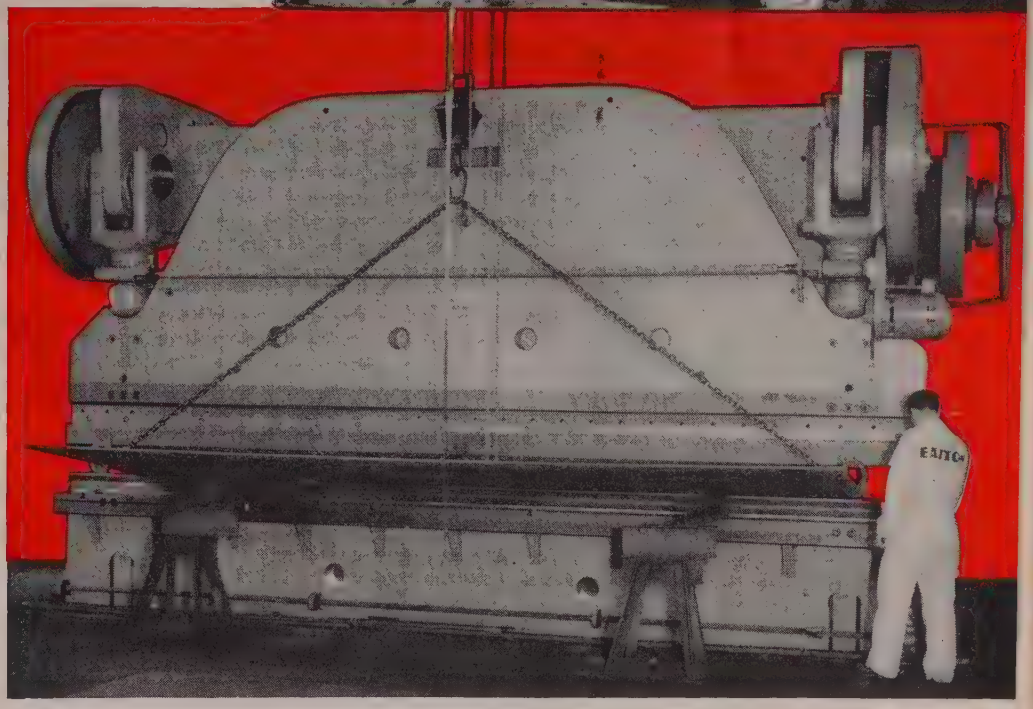


Illustration courtesy Easton Car & Construction Company, Easton, Pennsylvania.

Here a Cincinnati Press Brake is forming ½" plate for wide sections of off-highway trailers, at the Easton Car & Construction Company, makers of a large line of products for industrial transportation.

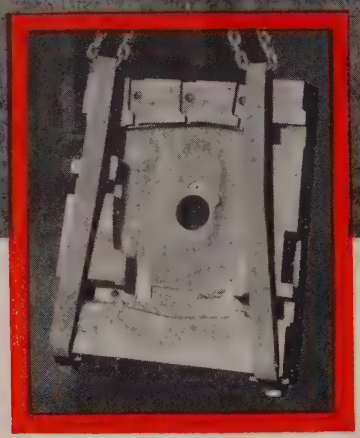
By using this Cincinnati Press Brake, some welding operations were eliminated, which improved the product, and reduced production costs at the same time.

The power, accuracy, and versatility of Cincinnati Press Brakes are reducing manufacturing costs where ever they are installed. If you form, or bend, you should investigate their possibilities.

Write for Press Brake Catalog B-4.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES



HOW LINDBERG STEEL TREATING COMPANY HELPS MOW YOUR LAWN

Plants in

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Gus Stuart next door . . Tom Dougherty down the street . . and Harry Van Hook in the next town are taking it easy.

For these lazy, lucky critters live in the era of the power lawn mower . . they just give it the gun, and zoom . . a beer-and-a-half later the yard is mowed, slick as a whistle.

We're not about to tell you Lindberg Steel Treating Company is solely responsible for the power lawn mower industry. That isn't exactly the case. But, along with dozens of designers, engineers, and production men, we kicked in our two cents worth.

Quite a few power lawn mowers have cast aluminum shells . . one of them is the "Lawn-Boy" made by *Outboard Marine & Manufacturing Company**. "*Outboard*" needed mold dies to produce these mower shells . . and the dies had to be heat treated. They were intricate, had plenty of irregular sections, and they were worth $15,000.

The highly polished surface finish had to be maintained. Critical dimensions had to be held. There could be no carb or decarb, because surface cracking or "orange peeling" would result. Brinnel hardness had to be held to a narrow range. And there could be no variation in hardness uniformity.

So the job was turned over to heat treating specialists . . metallurgical engineers of Lindberg Steel Treating Company. They determined the proper cycle for preheating, soaking, cooling, and tempering.

91 short hours after delivery to Lindberg, the dies were ready to produce aluminum mower shells. Heat treating is easy . . *if* you do the *right* thing, at the *right* time, in the *right* equipment, in the *right* way. We specialize in doing heat treating . . *right*. Call us.

* *RPM Manufacturing Company Division*

A case history of Lindberg Steel Treating Co. service to American industry

LINDBERG STEEL TREATING CO.
1973 North Ruby Street, Melrose Park (Chicago) Ill. Phone: Fillmore 4-4080

CALENDAR
OF MEETINGS

May 17-19, American Institute of Electrical Engineers: Appliance technical conference, Morrison hotel, Chicago. Institute address: 33 W. 39th St., New York 18. Secretary: N. S. Hibshman.

May 17-19, National Industrial Distributors Association: Annual meeting, Hotel Waldorf-Astoria, New York. Association address: 1900 Arch St., Philadelphia 3. Secretary: H. R. Rinehart.

May 17-20, Basic Materials Exposition: International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17.

May 19-21, Gas Appliance Manufacturers Association: Annual meeting, Drake hotel, Chicago. Association address: 60 E. 42nd St., New York 17. Managing director: H. Leigh Whitelaw.

May 19-21, American Institute of Electrical Engineers and American Welding Society: Electric welding conference, Hotel Schroeder, Milwaukee, Wis. Information: R. E. Young, publicity chairman, 1954 AIEE Welding Conference, 388 E. Court St., Kankakee, Ill.

May 20, Anti-Friction Bearing Manufacturers Association Inc.: Annual meeting, Westchester Country Club, Rye, N. Y. Association address: 60 E. 42nd St., New York 17. Secretary: H. O. Smith.

May 20-21, National Industrial Conference Board: General session for all associates and annual meeting of board members, Hotel Waldorf-Astoria, New York. Board address: 247 Park Ave., New York 17. Secretary: Herbert S. Briggs.

May 23-26, Copper & Brass Research Association: Annual spring meeting, The Homestead, Hot Springs, Va. Association address: 420 Lexington Ave., New York 17. Manager: Theodore E. Veitfort.

May 23-25, Building Research Institute: Spring meeting, Hotel Hershey, Hershey, Pa. Institute address: 2101 Constitution Ave., Washington 25. Executive secretary: William H. Scheick.

May 23-26, National Association of Purchasing Agents: Annual meeting and exhibit, Hotel Conrad Hilton, Chicago. Association address: 11 Park Place, New York. Secretary: G. A. Renard.

May 24-26, Automotive Engine Rebuilders Association: Annual meeting and conference booth program, Hotel Statler, Buffalo. Association address: 419 N. Capitol Ave., Indianapolis 4. Executive vice president: R. G. Patterson.

May 24-27, National Office Management Association: International conference and office machinery and equipment exposition, Kiel Auditorium, St. Louis. Association address: 132 W. Chelten Ave., Philadelphia 44. Executive vice president: W. H. Evans.

May 25-28, Industrial Diamond Association of America Inc.: Annual meeting, Hotel Claridge, Atlantic City, N. J. Association address: 124 E. 40th St., New York. Executive manager: Athos D. Leveridge.

May 25-28, National District Heating Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 827 N. Euclid Ave., Pittsburgh 6. Secretary-treasurer: John F. Collins, Jr.

May 26-27, American Iron & Steel Institute: Annual meeting, Hotel Waldorf-Astoria, New York. Institute address: 350 Fifth Ave., New York 1. Secretary: George S. Rose.

May 27-29, Steel Kitchen Cabinet Manufacturers Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: Engineers Bldg., Cleveland 14. Executive secretary: Arthur J. Tuscany Jr.

May 31-June 11, Canadian International Trade Fair & National Air Show: Exhibition Park, Toronto, Canada. Director of the Trade Fair: Glen Bannerman.

June 6-9, American Gear Manufacturers Association: Annual meeting, The Homestead, Hot Springs, Va. Association address: 302 Empire Bldg., Pittsburgh 22. Executive secretary: J. C. Sears.

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REMOVES RUST EASIER, FASTER
. . . provides good surface for paint

Detrex "800" quickly, easily and thoroughly removes rust from metal *without* scratching or marring the surface. It also leaves a mild coating of phosphate on the surface which retards rust and provides a good base for paint finishes. Paint finishes last longer, look better.

Detrex "800" eliminates scraping, brushing and other costly hand operations used to remove rust from castings, forgings, sheet metal and all other metal surfaces.

You apply Detrex "800" by wiping, brushing or spraying it on . . . even by dipping the parts. After a few moments, rust wipes off as easily as dried liquid polish. Meets civilian and government specifications for surface preparation prior to painting.

FINE FOR PICKLING OPERATIONS, TOO . . . Detrex "800" Rust Remover Series presents none of the fumes of hydrochloric or sulfuric acids, yet is just as effective when used as a pickling agent.

Please send me literature on Detrex 800 Series and arrange to schedule a free demonstration in my plant.

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SCREW SLOTTING NEWS

REVOLUTIONARY, NEW WATERBURY-FARREL MACHINE SLOTS 500 TO 2000 FINISHED BLANKS PER MINUTE

Unprecedented Saw Life Per Grind

This new Waterbury-Farrel #1 High Speed Screw Head Slotting Machine uses only one hopper, one dial and one saw to pour out from 500 to 2000 burr-free, slotted blanks per minute.

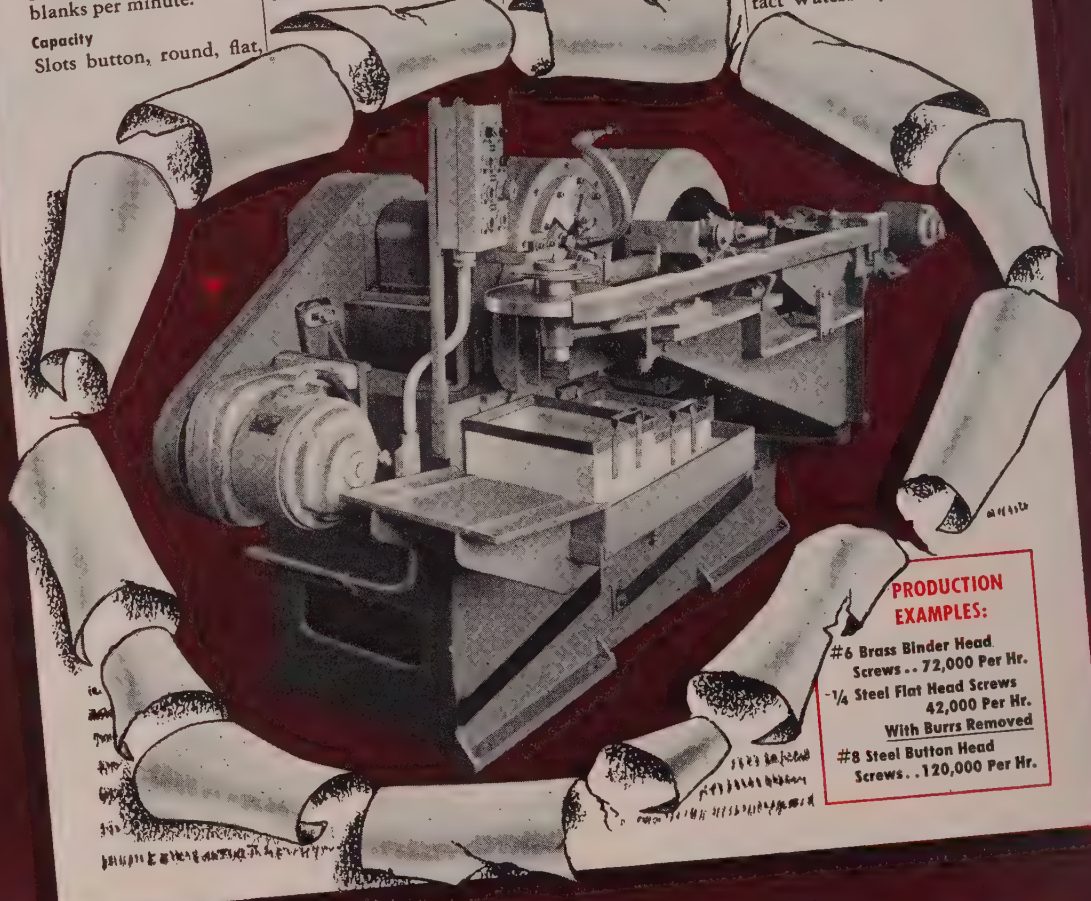
Capacity

Slots button, round, flat, flat oval, fillister, truss or binder heads (of brass or standard lower carbon machine steel), in sizes from #6 by ¼" minimum length to ¼ by 3" overall maximum length. Speeds of from 500 to 2000 per min. depend upon shape and size of head and whether steel or brass is used.

Fully Electrically Driven . . . Lubrication Safety Interlocked

Panel board control switches are safety interlocked so that oil flow must be started first. Then the saw, dial and feed are each started in that order by separate switches.

For further information on this outstanding new production machine, contact Waterbury-Farrel.



PRODUCTION EXAMPLES:

#6 Brass Binder Head Screws . . 72,000 Per Hr.

-¼ Steel Flat Head Screws 42,000 Per Hr.
With Burrs Removed

#8 Steel Button Head Screws . . 120,000 Per Hr.

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Offices: Chicago, Cleveland and Millburn, N. J.

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WF-3

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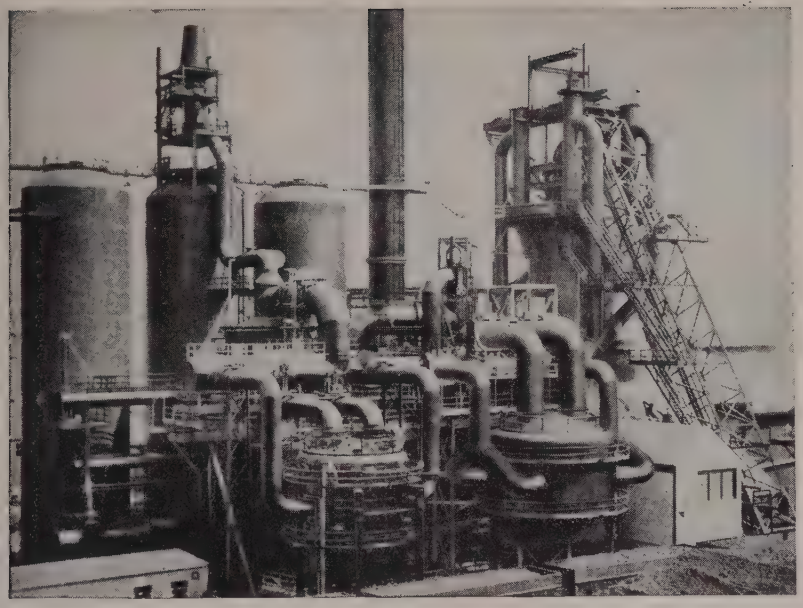


How Cottrell Precipitators Clean Gas in the Steel Industry

Iron Ore Sintering Plants

The first commercial Cottrell installation for cleaning gases coming from the iron ore sintering machines was placed in operation in 1952 with collection efficiencies exceeding 95%. In this installation the gases leaving the windboxes of the sintering machine pass to a flue, then to a mechanical collector, to the induced draft fans, to the precipitator, and then to stack. The gases enter the precipitator at temperatures of about 250 to 300F, with water vapor content of about 8%. The dust collected is dry and quite fine. The precipitators used on this application are of the horizontal steel plate type.

Iron Blast Furnaces

The cleaning plant in most iron blast furnace installations consists of the preliminary stage (dry dust catchers), the primary stage (water scrubbers) and the secondary stage (water-flushed Cottrell Precipitators). Dust and fume content of the gas is reduced to the range of 0.1 to 0.3 grains per cubic foot of gas corrected to standard conditions before it reaches the Electrical Precipitator. The function of the precipitator is to further clean this gas to a final dust content ranging in most cases from 0.005 to 0.01 grains per cubic foot, depending on how the gas is to be used.

Open Hearths

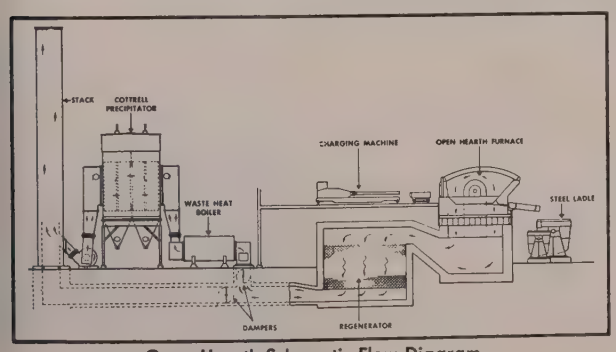
This problem involves the cleaning of combustion gases coming from furnaces, usually oil-fired, and carrying in suspension a heterogeneous mixture of very fine metallic oxides.

After extensive research and pilot plant studies, Research Corporation completed the first commercial precipitator installation for cleaning open hearth gases in 1951. Test results at rating indicated efficiencies of over 95% were obtained. Most of the time there was no visible discharge.

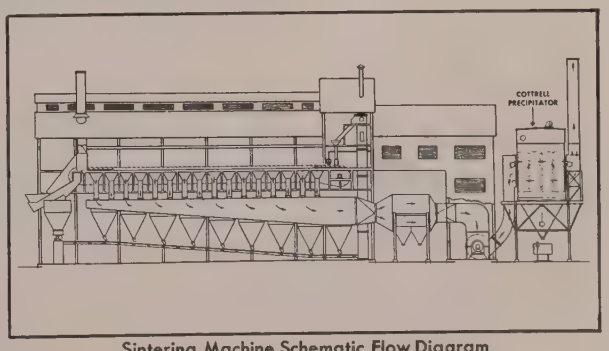
Other Steel Applications

In addition to the above, Research Corporation Cottrell installations are being used for detarring by-product coke oven gas, cleaning oven fuel gas and producer gas, and cleaning ferromanganese blast furnace gas.

Detailed information on all these applications is available through your nearest Research Corporation office.



Open Hearth Schematic Flow Diagram



Sintering Machine Schematic Flow Diagram

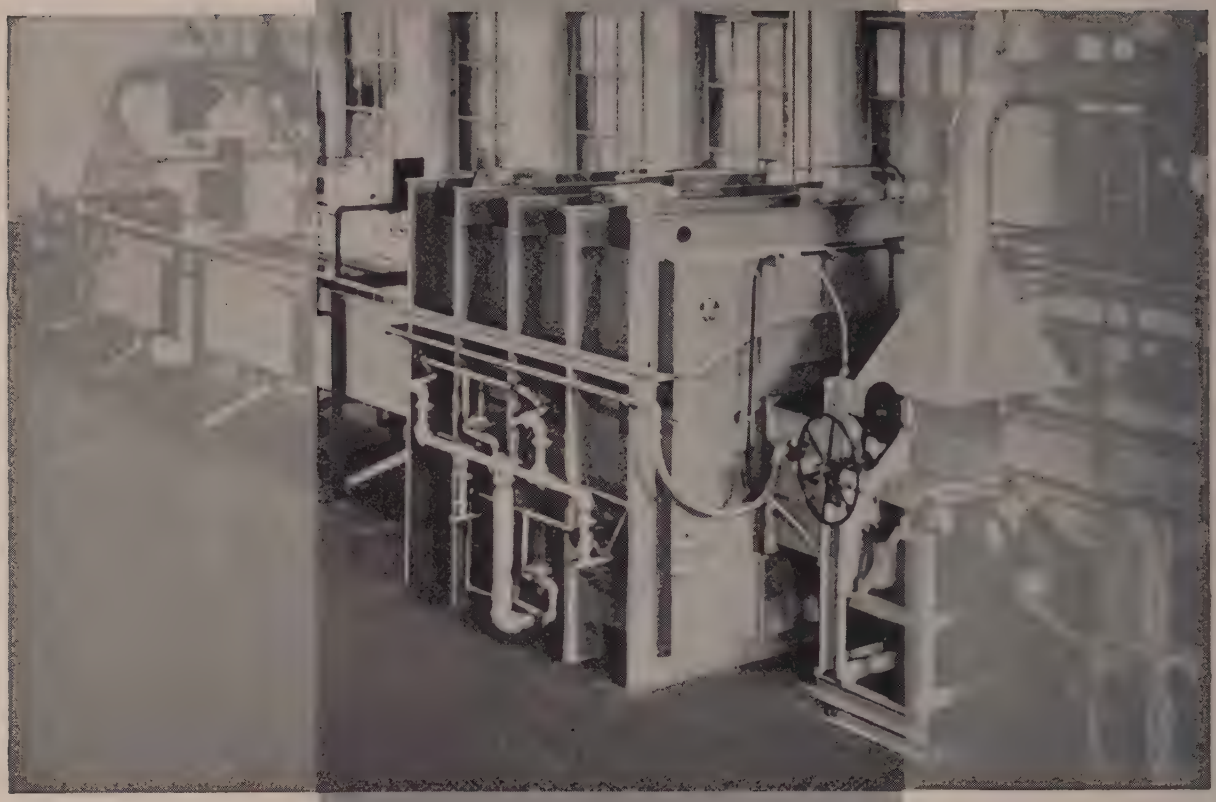
RESEARCH CORPORATION

405 Lexington Avenue, New York 17, N. Y. • *Bound Brook, N. J.*

Grant Building, Pittsburgh 19, Pa. • *122 South Michigan Avenue, Chicago 3, Ill.*

RC145

Gas-fired furnace used for continuous bright annealing on the 25" high-speed stainless steel strip line at Rodney Metals, Inc., New Bedford, Mass.



Rodney Metals finds GAS best for annealing, brightening, paint baking

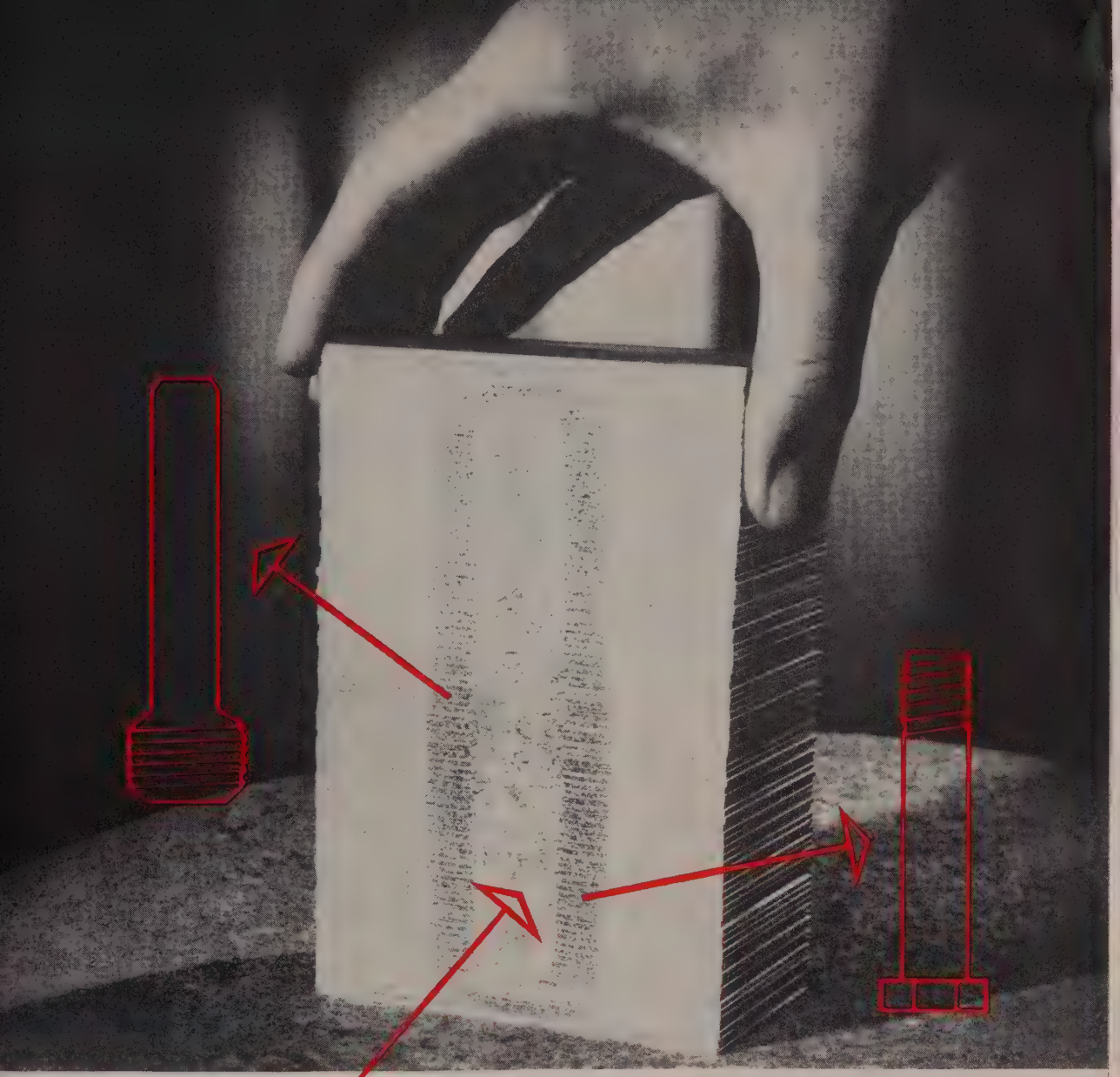
At Rodney Metals, Gas does three separate jobs. First, a Gas-fired furnace bright anneals stainless steel strips in widths up to 25" and thicknesses down to 0.002". Also, in a bell-type furnace used to box anneal carbon strip to a bright finish, Gas as a protective atmosphere reduces oxidation to a minimum. And third, a Gas-fired oven bakes vinyl and enamel finishes to steel and aluminum strip—so well that they won't crack or peel, even when the metal is drawn to its limit.

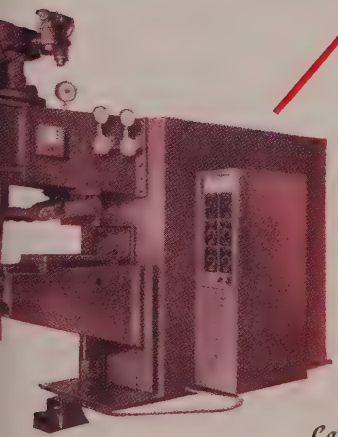
Is there a problem spot in your production line? Could clean, even-heat Gas help? Modern Industrial Gas Equipment is designed to improve and blend in with production-line techniques wherever heat is required in processing operations. When you have a problem in your production line involving heat processing, call your Gas Company representative. He'll be glad to discuss the economies and results you can expect from using Gas and Gas-fired equipment.

American Gas Association

MORE AND MORE THE TREND IS TO GAS FOR INDUSTRIAL PROCESSING

420 LEXINGTON AVENUE, NEW YORK 17, N.Y.





Spotwelding of Scrap Sheet Titanium Forms Solid Ingots for Machined Parts

A six inch pile of 85 laminations of .064 titanium with two laminations at each end of .091 titanium is joined with one weld on a Sciaky type PMCO 6ST 400 KVA Three-Phase Spot Welder. The weld nugget forms a solid ingot of virgin metal at least as strong as the parent metal. This ingot can be machined into a variety of titanium parts. Months of lead time required for titanium is avoided and expensive scrap is utilized.

Developed by the Manufacturing Research and Development Unit of the Glenn L. Martin Company, this technique offers another fine example of Sciaky basic thinking in design of resistance welding equipment to do *more useful work* at *lowest operating cost* with *maximum reliability*.

Largest Manufacturers of Electric Resistance Welding Machines in the World

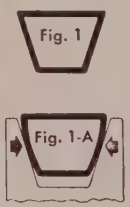
SCIAKY

4909 West 67th Street, Chicago 38, Illinois

if you want lower V-Belt costs—

When a V-Belt bends, you can feel its sides change shape.

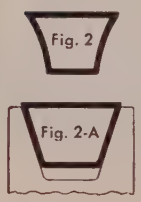
—just make this simple test



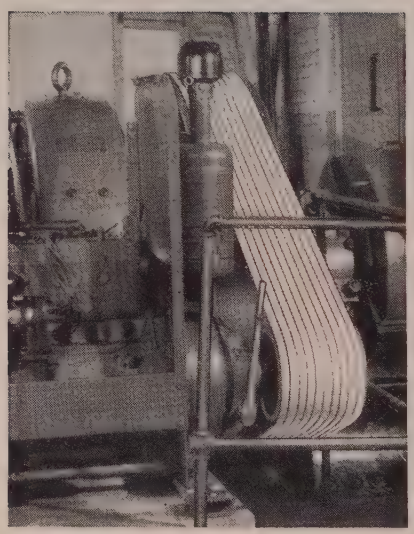
Take *any* V-belt that has *straight* sides (Fig. 1). Bend that V-belt while you grip its sides with your fingers. You will *feel* the sides *bulge out* (Fig. 1-A). Clearly, that out-bulge forces the belt to press *unevenly* against the V-pulley—and this *concentrates* wear at the points shown by arrows (Fig. 1-A).

Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2)

(U.S. PAT. NO. 1813698)



Instead of *bulging,* the precisely engineered CONCAVE SIDES merely *fill out* and become perfectly straight. This belt, when bent, *precisely fits* its sheave groove (Fig. 2-A). The sides of the Gates Vulco Rope press *evenly* against the V-pulley. Therefore, wear is distributed *uniformly* across the *full face* of this belt —resulting in *longer* belt life and *lower* belt *costs* for you!



Typical Gates Vulco Rope Drive —the Gates V-Belts are built with Concave Sides to insure longer belt wear.

When you buy V-belts, be sure to get the V-belt with the Concave Sides—the Gates Vulco Rope!

Gates VULCO ROPE DRIVES

REG. U. S. PAT. OFF

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

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DENVER, U.S.A.

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any way you look at it . . .

SIMONDS grinding wheels for CYLINDRICAL GRINDING give top quality, low cost production

Surface finish as you want it! Fast stock removal! Lasting wheel action that holds up on corners and maintains radii. That's the kind of efficiency these wheels deliver on traverse or plunge-cut cylindrical jobs. Send for catalog bulletin ESA-191 and name of your nearest Simonds Abrasive Distributor.

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METAL BAND SAWS

SURGICAL INSTRUMENTS, ETC.

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DOCTOR BLADES

Some "Character References" for Sandvik Spring Steel Quality

TEXTILE MACHINE PARTS

RAZOR BLADES

FEELER GAUGES

PISTON RING SEGMENT AND EXPANDERS

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SINKERS, NEEDLES, ETC.

COMPRESSOR VALVES

A WIDE VARIETY OF SPRINGS

CLOCK AND WATCH SPRINGS

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TROWELS

SHOCK ABSORBERS

REEDS

KNIVES

On this page are some of the tough applications Sandvik Steels are now successfully handling. They are the best kind of testimonial for the "character" . . . the inherent high quality of Sandvik spring steel.

Each of these applications demands its own special combination of high fatigue life, fine surface finish, accurate and uniform size and special physical properties. In every case, one of Sandvik's wide variety of steels fits the requirements to a "T".

If you feel that a better spring steel would improve *your* product, why not check with Sandvik.

Sandvik Swedish specialty strip steels are available:

- **In specialized analyses for specific applications.**
- **Precision-rolled in thicknesses to fit your requirements.**
- **In straight carbon and alloy grades.**
- **Annealed, unannealed or hardened and tempered.**
- **Polished bright, yellow or blue.**
- **With square, round or dressed edges.**
- **Wide range of sizes in stock — also slitting facilities available.**

Talk over your spring steel application with a Sandvik spring steel specialist. No obligation, of course.

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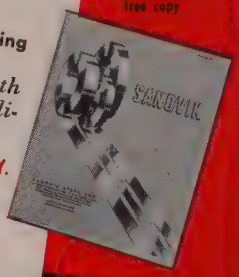
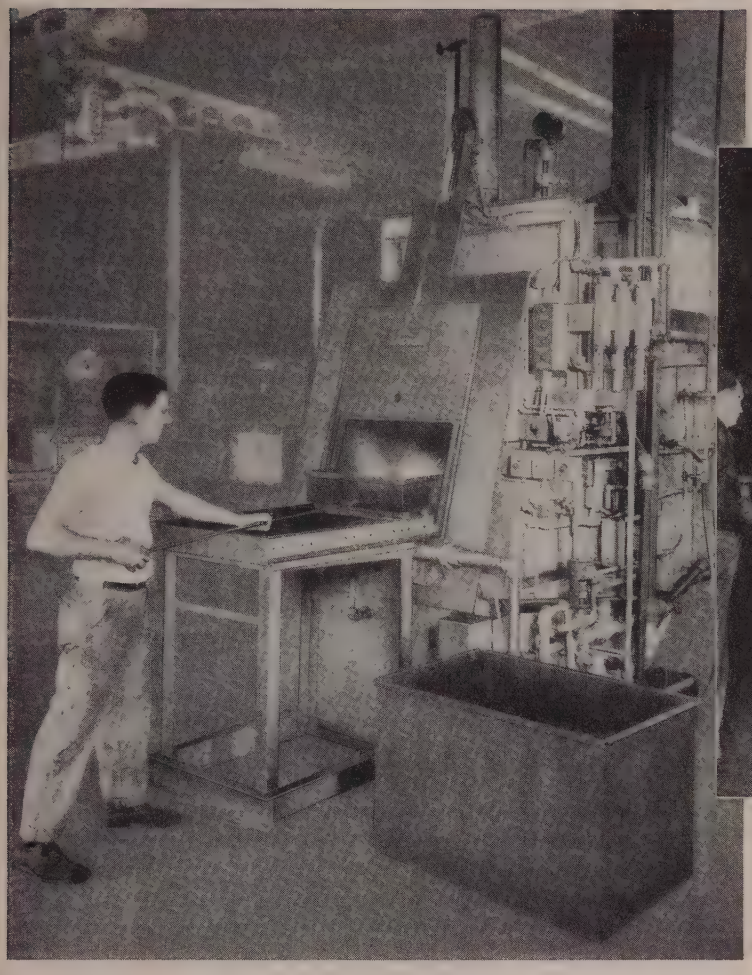
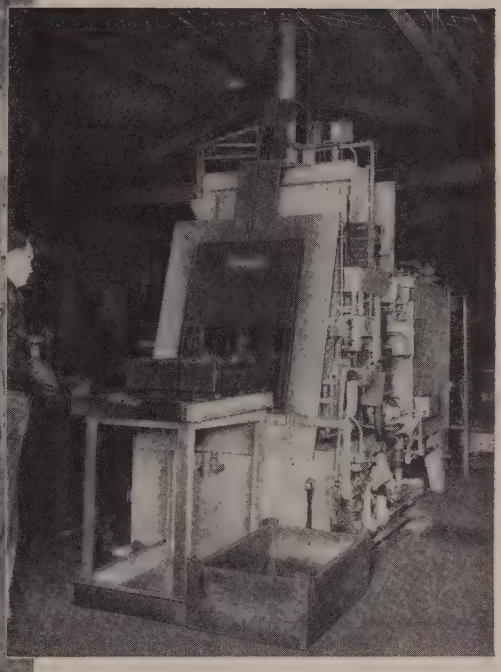
Gives thickness, width, hardness, types of edges and weight in pounds per hundred feet. Write for your free copy



Sandvik Quality Steels





Left: New England Metallurgical Corporation installed first Lindberg Carbo-nitriding Furnace at Worcester plant.

Above: Six months later New England Metallurgical installed second Carbo-nitriding Furnace at Boston pant.

One *LINDBERG* Carbo-nitriding Furnace merited another at New England Metallurgical Corporation

"Our first Lindberg Carbo-nitriding furnace in January . . our second one installed just 6 months later!" Yes, that's what happened in the plants of New England Metallurgical Corp., Boston, Mass., for more than 28 years well known commercial heat treaters.

The first unit, a gas fired, radiant tube, carbo-nitriding furnace went to the company's Worcester plant known as Greenman Steel Treating Company.

Six months later a second Lindberg Carbo-nitriding furnace was installed in the Boston plant of New England Metallurgical Corporation . . and this team of versatile "work horses" have been continually turning out production . . 24 hours a day.

Mr. Lloyd Field, Vice-President and General Manager of the Worcester Division, has this to say about the Lindberg Carbo-nitriding Furnaces: "We selected Lindberg Carbo-nitriding Equipment for the usual reasons . . cost cutting . . uniform, quality work . . high, dependable production. But more than that . . as you know, variety seems to be the spice of a commercial heat treater's life, and because of the versatility of the Lindberg Carbo-nitriders, which are actually five furnaces in one, they are without doubt our busiest and most valuable pieces of equipment.

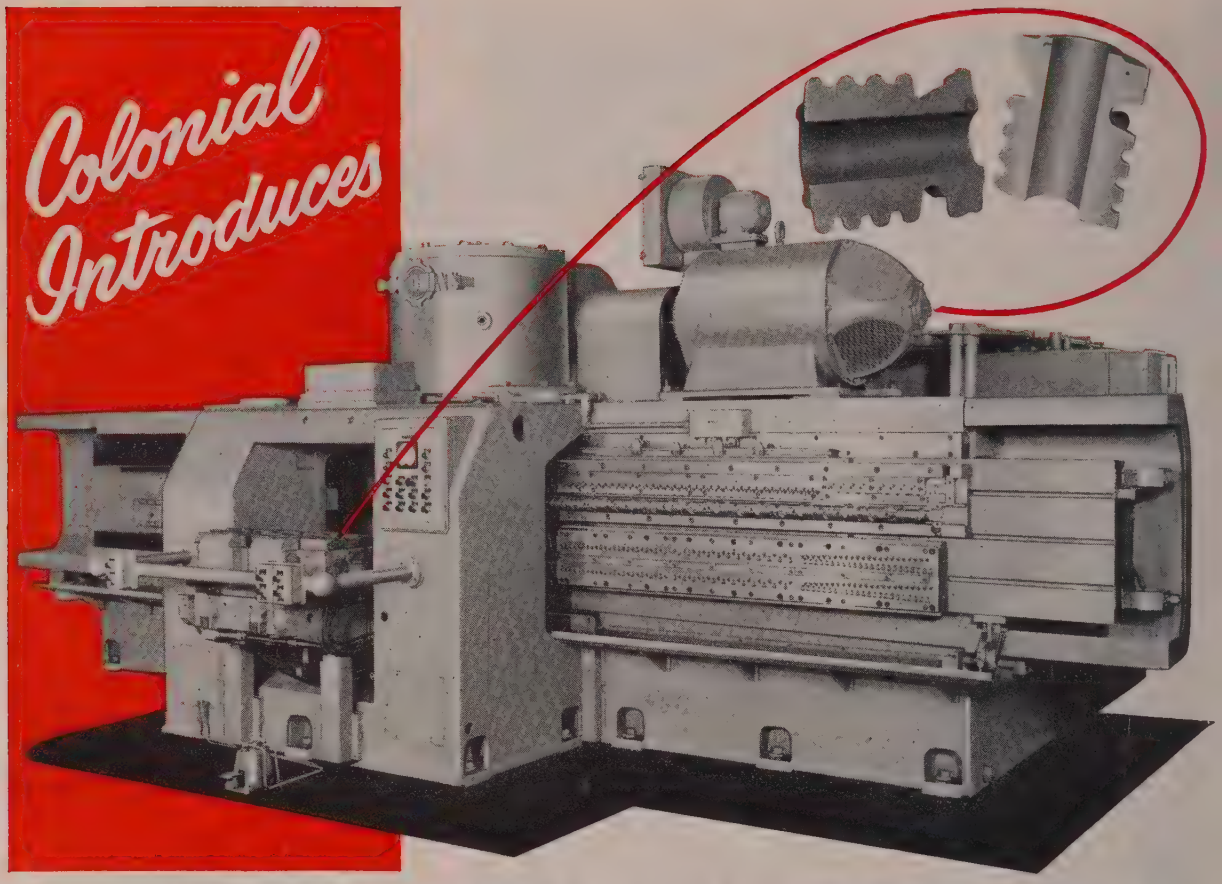
"When customers send in work for carbo-nitriding, carburizing, neutral hardening, annealing, or carbon restoration, a hue and cry goes up to check for room on the heavy schedules of the Lindberg Carbo-nitriding Furnaces."

Lindberg Carbo-nitriding Furnaces can do a job for you, too. Ask for bulletin No. 241.

LINDBERG FURNACES

Lindberg Engineering Company • 2441 Hubbard Street • Chicago 12, Illinois

Colonial Introduces



the MECHANICAL HORIZONTAL

for faster broaching of surfaces

The model HM-25-130, is the first in a new line of Colonial MECHANICAL HORIZONTALS. It removes 3½ pounds of metal, with depth of cut varying from 5/32 to 3/16 of an inch, in a 21-second broaching cycle from two cast iron bearing cap clusters. Tungsten carbide-tipped tool bits mounted on the 24" wide ram, travel at more than 140 feet per minute. The machine broaches on both the forward and return strokes, doubling the length of cutting action as compared to ordinary broaching. The machine has a 130-inch stroke and 25-ton capacity. Broaching speed is variable (30 to 150 sfm) through rheostat control of the direct current 150 hp motor.

Trunnion-type fixture has hydraulic clamping, positioning, and shuttling. All automatic cycle hydraulic and electrical controls are interlocked, and this equipment is installed according to J.I.C. standards. Table level loading of work and floor level accessibility of the broach inserts and practically all operating parts are important features of the machine. Floor space is 194 x 290 inches.

This is a Colonial Unified Broaching Installation.

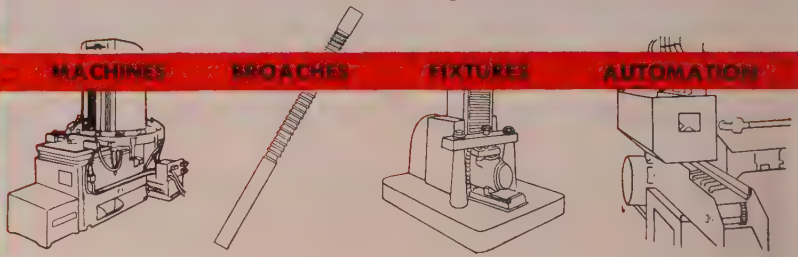
Unified Broaching

POWERED BY M.S.S. BROACHING

COLONIAL

DETROIT 13

MACHINES BROACHES FIXTURES AUTOMATION



Unsurpassed-anywhere!

IT ALL COMES DOWN to one fact... that you can always count on Roebling high carbon flat spring steel to reduce preparation time, machine stoppages and rejects to a minimum. What's more, it's made as you want it... annealed, hard rolled untempered; scaleless tempered; tempered and polished, blued or strawed.

You *pay* for the best every time you buy flat spring steel. Make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

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PHOTO BY MCNAMUS

HOW TO KEEP OIL CIRCULATING SYSTEMS CLEAN

OIL FILM BEARINGS on back-up rolls need the protection of a constant flow of rugged lubricant. *Texaco Regal Oil* is ideal for this service. It keeps oil lines clear and bearings clean for smoother operation, longer bearing life and lower maintenance costs.

Texaco Regal Oil is a heavy turbine-quality oil with high resistance to oxidation, emulsification and sludging. It separates rapidly from water that may work past the seals — keeps the system free from sludge.

For your enclosed reduction gears, use *Texaco Meropa Lubricant* — noted for its EP stability, its resistance to oxidation, thickening and foaming.

A Texaco Lubrication Engineer will be glad to show you how effective lubrication can increase efficiency and reduce costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

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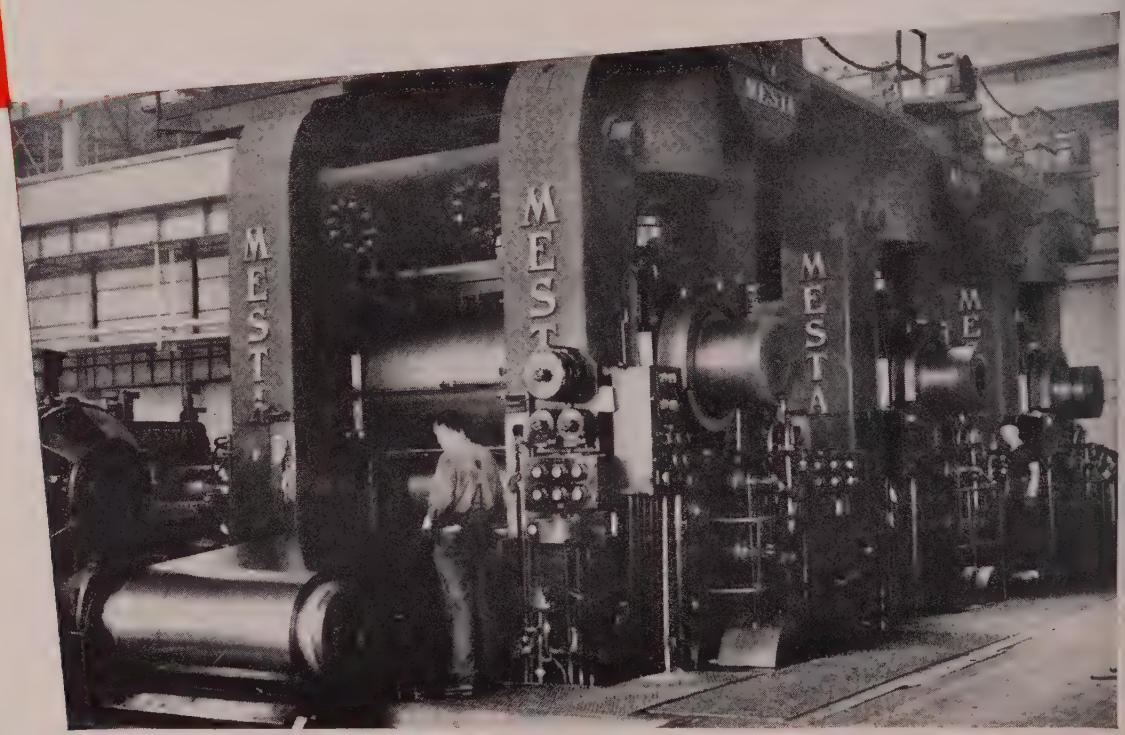
The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO

TEXACO Regal Oils

(HEAVY CIRCULATING OILS)

STEEL
May 17, 1954

Metalworking Outlook

Who Says Recession?

A steady rise in industrial sales through 1954 is predicted by Ralph Cordiner, General Electric Co. president. He expects fourth-quarter sales will be 4 per cent above the first quarter. Total 1954 industrial business is placed at only 2 per cent under the peak 1953 total. Adds the GE executive: "And the companies that have the most competition are the ones who are faring the best."

Buy American

Metalworking companies that are feeling strong foreign competition are enlisting aid in a campaign to defeat extension of the reciprocal trade agreements act and to otherwise tighten up on imports. The movement is strongest along the Atlantic seaboard, but it is extending throughout the country. A major steel supplier in Chicago reports it is receiving letters almost daily from metalworking customers asking support for a "Buy American" drive. The supplying companies are sympathetic to the plight of companies hurt by the influx of foreign merchandise but are reluctant to oppose administration policy. Besides, they say, "if we sell abroad, we must also buy abroad."

Big Steel Talks

Opening negotiations on a new steel wage contract start Tuesday. As usual, the first few meetings will be devoted to outlining the ground rules and preliminary skirmishing. Serious negotiations won't get under way until late this month or even early June. Probable outcome: Improved pensions, possibly a few cents concession in direct wages or other benefits. Guaranteed annual wage demands have little more than an outside chance, although joint study of the proposals may be authorized.

"No-Raid" Pact

Although the CIO's executive board voted unanimously to put into effect the much talked about "no raiding" agreement with the AFL, don't expect all the unions to observe it. In the CIO, the steelworkers and textile workers may not even sign. Others have warned they will observe the pact only as long as their rival unions do. In the AFL, the teamsters and a score of lesser unions won't go along with the pact.

Stabilization

While few industry people believe important concessions will be made to the unions on the guaranteed annual wage this year, the demand points up what may be one of industry's knottiest problems in the next decade: Stabilizing production and employment. GAW won't work without it; if you have it, GAW demands would be meaningless. The problem is explored in No. 4 of STEEL's Program for Management series (p. 87). Erratum: In exhibit on page 91, "What Would Guaranteed Annual Wage Cost?",

last paragraphs in columns 2 and 3 were inadvertently transposed in early press copies.

Give Us Room

Assorted municipal taxes—sales, income, realty, transaction—plus inadequate expansion space in crowded cities are forcing more and more manufacturers and distributors to put up new plants on suburban and country sites. So reports Grant A. Sattem of Luria Engineering Co. The trend means an unprecedented opportunity for sales of pre-engineered, mass-produced buildings. Mr. Sattem sees a 15-per-cent increase in such sales this year over 1953.

Move Contracts, Not Men

The Army is instructing its contracting officers to place procurement "at sources of labor supply rather than to move the labor supply." Where feasible, the service will avoid placing additional contracts in areas where labor is in short supply or approximate balance. With $3 billion additional defense spending recommended as result of developments in Asia, local communities can help their employment situation by making available specific information on labor supply and production facilities.

Tax Bill Overhaul

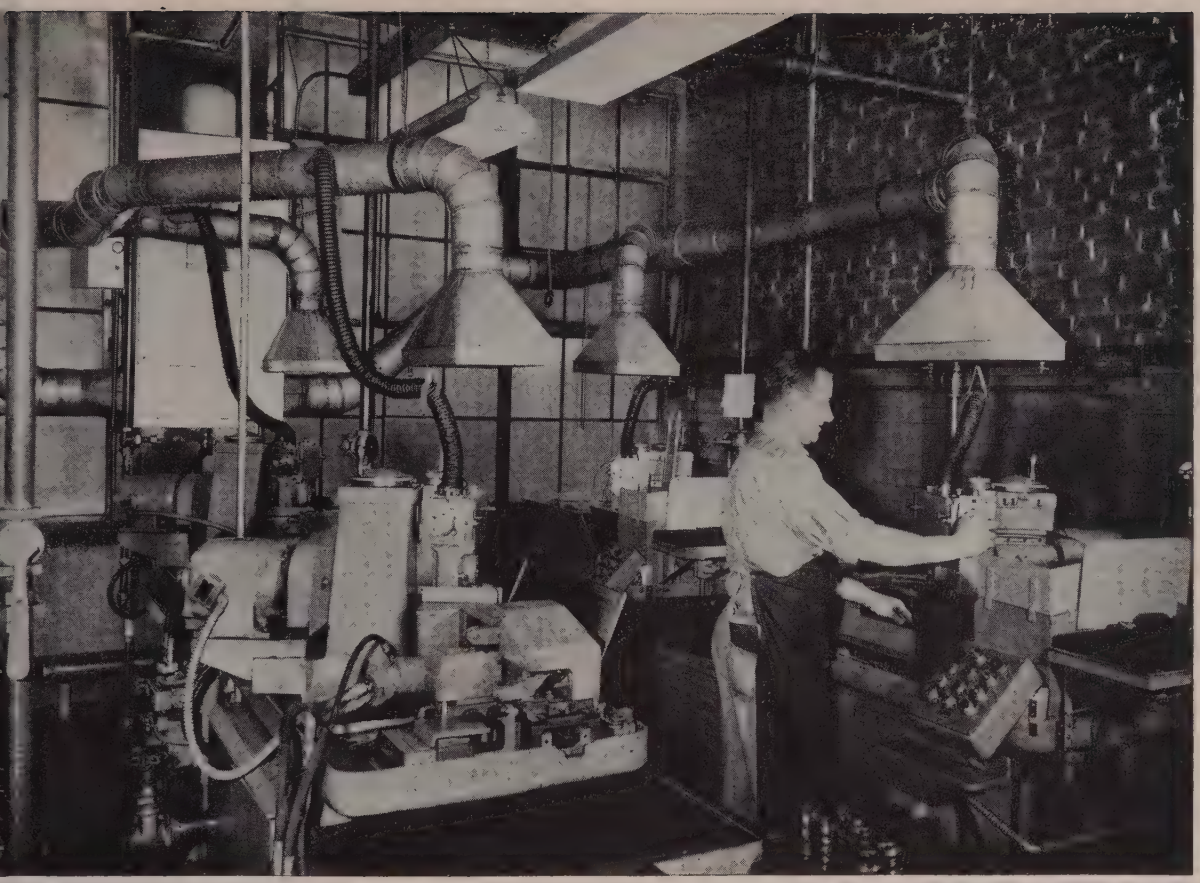
The administration's tax revision bill, due from the Senate Finance Committee in a few weeks, will have some major revisions, many of which will be welcomed by business and industry. Samples: Depreciation rules will be eased still further; new rules will be written covering taxation of mergers, reorganizations and partnerships; foreign income provisions will be treated more favorably. The changes recommended by the Senate Finance group will have a good chance of approval by Congress.

Straws in the Wind

New entry in the large, field-erected furnace business reportedly will be Lindberg Engineering Co., Chicago builder of heat-treating furnaces . . . General Electric Co. last week dedicated its $25-million medium transformer plant in Rome, Ga. . . . Electro Refractories & Abrasives Corp. reports an 82-per-cent increase in toolroom grinding wheel sales, despite decline in auto production and inventory adjustments . . . Hearings will open May 19 to develop legislation for an emergency ship repair program, deemed necessary by Senator Butler (Rep., Md.) to prevent "almost total collapse of the United States shipbuilding industry."

This Week in Metalworking

Both steel and nonferrous warehouses fast are becoming industrial supermarkets as they add products, stock more sizes (p. 47) . . . Investment castings producers prepare to do a big selling job on civilian users (p. 48) . . . Fewer frills, more down-to-earth demonstrations and helpful information mark the 1954 foundry show in Cleveland (p. 49) . . . Industry's vacation plans for this summer show a slowdown in the trend toward plant shutdowns (p. 50) . . . Roadmap of future federal highway construction plans takes shape (p. 52) . . . Office automation may be a $1-billion industry within the next 5 years (p. 59).



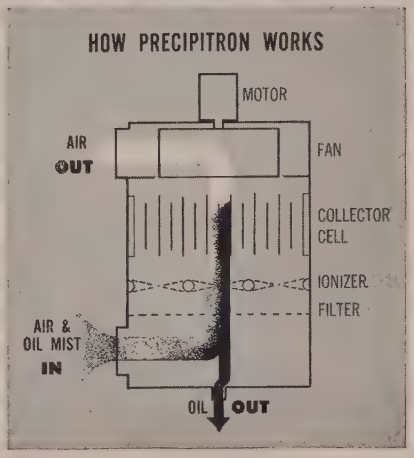
This view shows a PO-12 oil mist control unit and duct for flute-grinding machines.

WESTINGHOUSE PRECIPITRON ELIMINATES COSTLY AND DANGEROUS OIL MIST

Operating at full tilt, scores of thread-grinding and drill-fluting machines created an oil mist problem at Greenfield Tap & Die.

To overcome this situation, Greenfield installed several oil mist control units, incorporating a PRECIPITRON with a Westinghouse non-overloading fan. Now, oil mist and smoke are removed from the air and collected on the plates of the Precipitron by electrostatic action. Clean, mist-free, filtered air flows back into the shop . . . working conditions have been improved 100%—employee discomfort eliminated—and management satisfaction is complete.

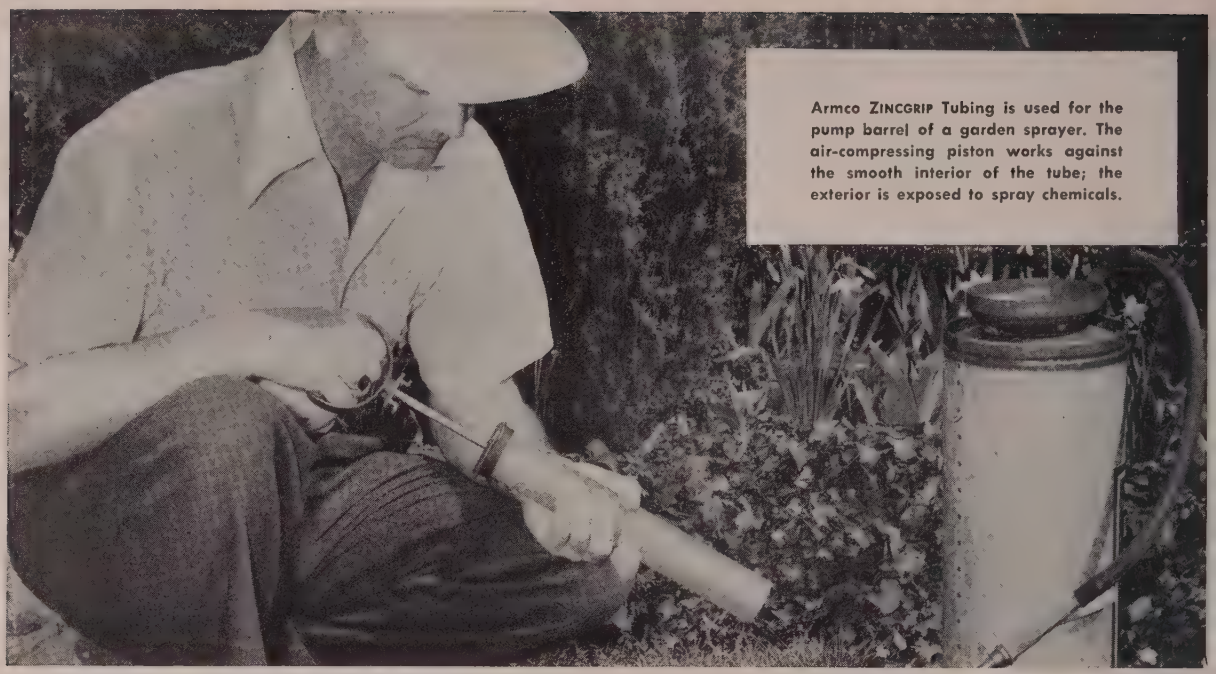
If you have an oil mist problem, get in touch with your Westinghouse-Sturtevant sales engineer today. He has a full knowledge of the application of air handling and air cleaning apparatus to meet your requirements. Call your local Westinghouse office or write Westinghouse Electric Corporation, Sturtevant Division, Boston 36, Massachusetts.



Oil-laden air passes through filter which strains out chips and abrasive particles . . . ionizer electrically charges each oil mist particle . . . then collector cell attracts and separates oil and smoke from the air stream. Clean air continues on through. Oil forms into droplets on collector cell plates and falls to the sump for re-use.

WESTINGHOUSE AIR HANDLING

YOU CAN BE SURE...IF IT'S Westinghouse J-80392



Armco ZINCGRIP Tubing is used for the pump barrel of a garden sprayer. The air-compressing piston works against the smooth interior of the tube; the exterior is exposed to spray chemicals.

AT LAST...welded steel tubing that's ZINC COATED

Have you avoided using welded steel tubing in your products because you couldn't get the rust protection of a zinc coating? You can now obtain Armco Tubing made of ZINCGRIP, the steel coated on both sides in a bath of molten zinc by a patented process.

This special zinc coating doesn't peel or flake when severely formed or drawn. It gives the steel *complete* protection—your tubular products lasting beauty.

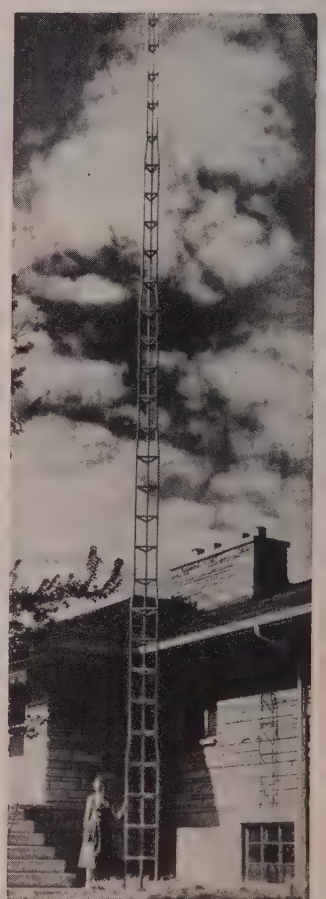
EVEN WELD IS COATED

There's no welding flash on the outside of the tube. It's planed away and a new zinc coating is applied by a special metalizing process. The location of the welded and recoated seam can be found only by careful inspection—it's that smooth!

WORKS LIKE COLD-ROLLED TUBING

Because of the high ductility of the steel base and the remarkable adherence of the zinc coating, you can cold-work Armco ZINCGRIP Tubing to practically the same extent as cold-rolled tubing. Moreover, it is supplied in many special shapes.

For further information on Armco ZINCGRIP Tubing fill in and mail the coupon. If you are interested in uncoated welded tubing of cold-rolled steel, just make a note of it.



50-foot television tower made of Armco ZINCGRIP Tubing. When erected, this self-supporting mast is rigid enough to permit a technician to climb to the top to complete installation.

☐ Send me more information on Armco ZINCGRIP Tubing
☐ Send me a copy of the booklet, "Armco Welded Steel Tubing"
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ARMCO STEEL CORPORATION

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ARMCO®

New Vistas for Mid-America

Action of the House of Representatives in approving the St. Lawrence waterway project by a decisive majority opens the way to new and attractive vistas in the development of the American economy.

For two or three decades the proposal to deepen the channels from the lower St. Lawrence to the Great Lakes has been opposed vigorously by the railroads, eastern seaboard ports and many others whose own direct interests seemed to be imperiled by the project. It is quite fair to say, at this stage, that much of this sincere opposition stemmed from a rather smug satisfaction that ours was a self-sufficient nation and that we could get along pretty well without any extensive trade with foreign countries.

We must admit that in the great midwest interior of the nation we have had a woeful and lamentable ignorance of foreign trade. Only on the Atlantic, Pacific and Gulf Coast seaboards have people gained even a rudimentary idea of what is involved in the fascinating intricacies of free-flowing trade between nations.

As almost everybody realizes, the change in attitude which led to approval of the waterway was the realization by influential persons that the United States no longer is self-sufficient. The people who for many years had opposed the seaway because Minnesota ores still were available in great volume, suddenly changed their attitude when abundant, rich resources were discovered in Labrador, Liberia, Venezuela and elsewhere.

Just as a change from a narrow, provincial attitude to a broader, international outlook was responsible for approving the St. Lawrence waterway proposal after several decades of failure, just so will be the influence of the 27-foot channel in the future. Even today several hundred small vessels are coming into the Great Lakes from Europe each year. A decade hence, thousands will come into the very center of American enterprise and their presence will change the stubborn provincialism of the great midwest area to an enthusiastic appreciation of the mutual benefits of a free-flowing world trade.

The educational potentials of the seaway for millions of inlanders are tremendous and important.

E. L. Shaner

EDITOR-IN-CHIEF

LEVELING EMPLOYMENT: Fourth in this publication's articles on major management problems of 1954 (pp. 87-94) deals with stabilizing production and employment. Management long has realized that a steady rate of operations is more profitable than one that fluctuates violently and also makes for greater security for employees. Practically every "an-

nual wage" program in effect today was introduced by employers and not by employees or unions.

This fact will make it difficult for industry to combat forthcoming arguments by unions in favor of a "guaranteed" annual wage. However, there are important differences between annual wage programs now in force and those proposed for the future. One difference is that most of the former are in consumer industries where operations usually are rather stable. Coming up are demands for programs in durable goods industries, where fluctuations are much more violent.

In the final analysis, the arguments will boil down to how far it is feasible to go in assuring greater employment security.

* * *

NEW VACATION TRENDS: Experts say that during the forthcoming summer vacation season there will be an increase of 15 per cent in the number of manufacturers who will close down completely to permit all of their employees to take vacations at the same time. Nevertheless, increased competition and a greater liberality in the length of vacations granted are tending to slow down the trend toward complete plant shutdowns.

That a primary aluminum producer (p. 50) has discovered that 70 per cent of its employees now are entitled to a three weeks' vacation will come as something of a surprise to many employers. Managers who once readily acquiesced to a wholesale shutdown for two weeks in a sellers' market may balk vigorously against a three weeks' blackout in a highly competitive buyers' market.

* * *

AVOID MISSING A BET: A subject of timely importance to the management of most metalworking establishments is the intelligent selection of engineering materials. There was a time when the choice of suitable materials was quite limited. Today that condition does not exist. Instead, the rapidity with which new materials are being developed and with which new applications of old materials are being discovered and perfected taxes the ability of many manufacturers to keep abreast of the times.

The problem in many shops can be described in simple terms. The design engineer has specified a material (p. 98) that seems to be serving its purpose satisfactorily. But the pressure of competition frequently prompts this engineer to think along these lines: "Yes, this material is good, but if I could find something that would do this or that just a wee bit better, our company would barge way ahead of our competition. In short, are we missing a bet because we don't know all the facts about new or improved materials?"

* * *

DON'T HAVE TO BE BIG: Much of the current literature on the subject of automation gives the impression that this is a technique of mass production that is applicable only to large volume operations. As time goes on, discussion of automatic operations in industry probably will disprove this conception effectively. Meanwhile, there are a number of current developments which afford the small operator assurance that he can employ automation to advantage.

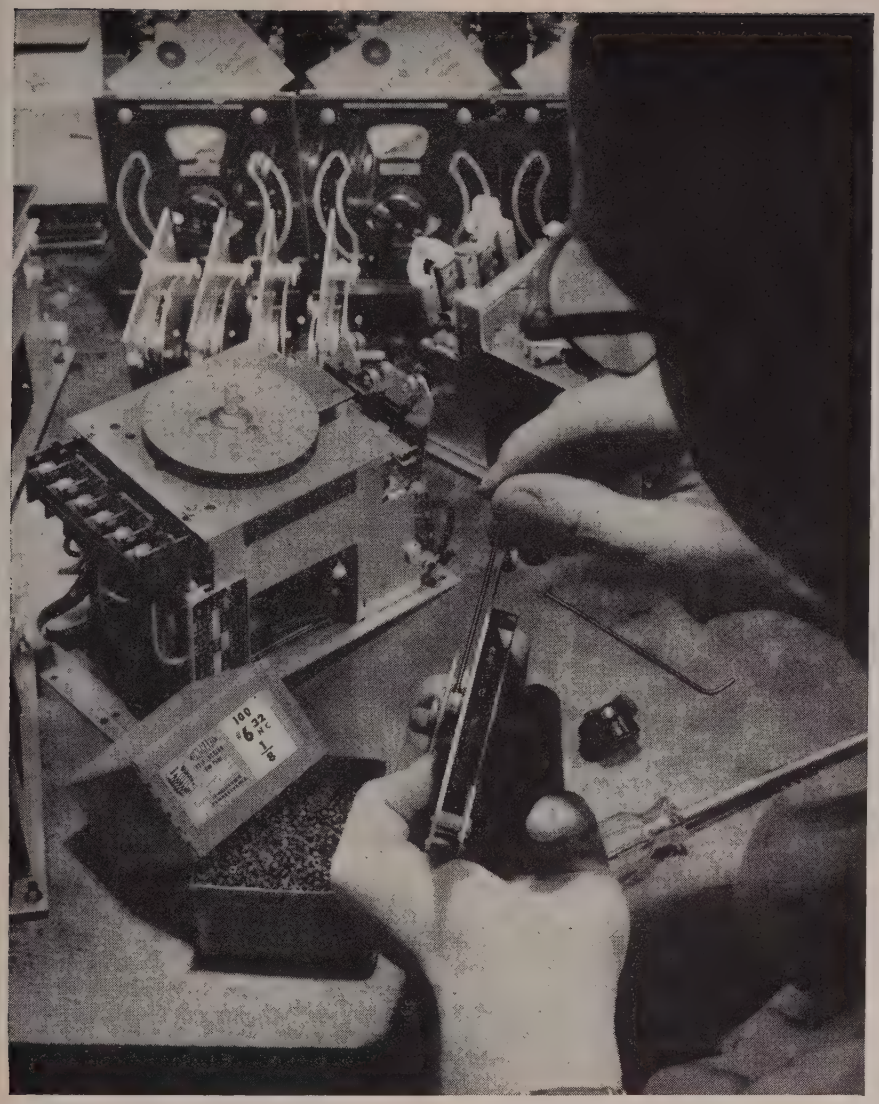
General Electric has perfected a system called "record-playback control" which is adapted to the automatic machining of parts too complex for hand operation and with sufficient flexibility to appeal to small-lot producers. The system consists simply of recording motion on magnetic tape (p. 100) and playing it back for the automatic programming of production and processes. The play-back feature may loom prominently in the effort to adapt the virtues of automation to small-lot manufacture.

* * *

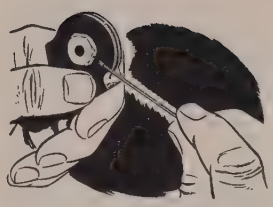
ACCELERATED PROGRESS: Among visitors to the 58th annual convention and exhibit of the American Foundrymen's Society in Cleveland last week there doubtless were many who are competent from their own experience to pass judgment on how far the American castings industry has progressed in recent decades. Early in the century, foundries were run on a rule-of-thumb basis. A trade secret was an important stock in trade. The typical foundry was not an ideal place in which to work.

Today trade secrets have vanished. There is a healthy interchange of "know how." Most foundrymen are promoting more intensive education and training. Scientific methods have replaced rule-of-thumb practices. Today's foundrymen rely heavily on research. Every day the modern casting shop becomes a better place in which to work.

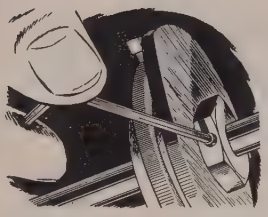
The Cleveland convention and show clearly reflected an acceleration in foundry progress.



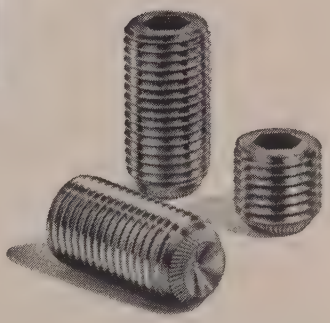
UNBRAKO Self-Locking Socket Set Screws are used to hold the Vernier-Set or Cycle-Progress cam on the shaft of this precision timing device. Once they are tightened, they maintain the accurate setting so important to the operation of the instrument.



Because they are so tiny, the UNBRAKO set screws are picked up and started in the tapped hole with the long arm key.



The compactness of the design of the timing device makes it necessary to turn the screw in prior to assembly. The uniform depth and size of the hex socket permit maximum torquing, speed assembly.

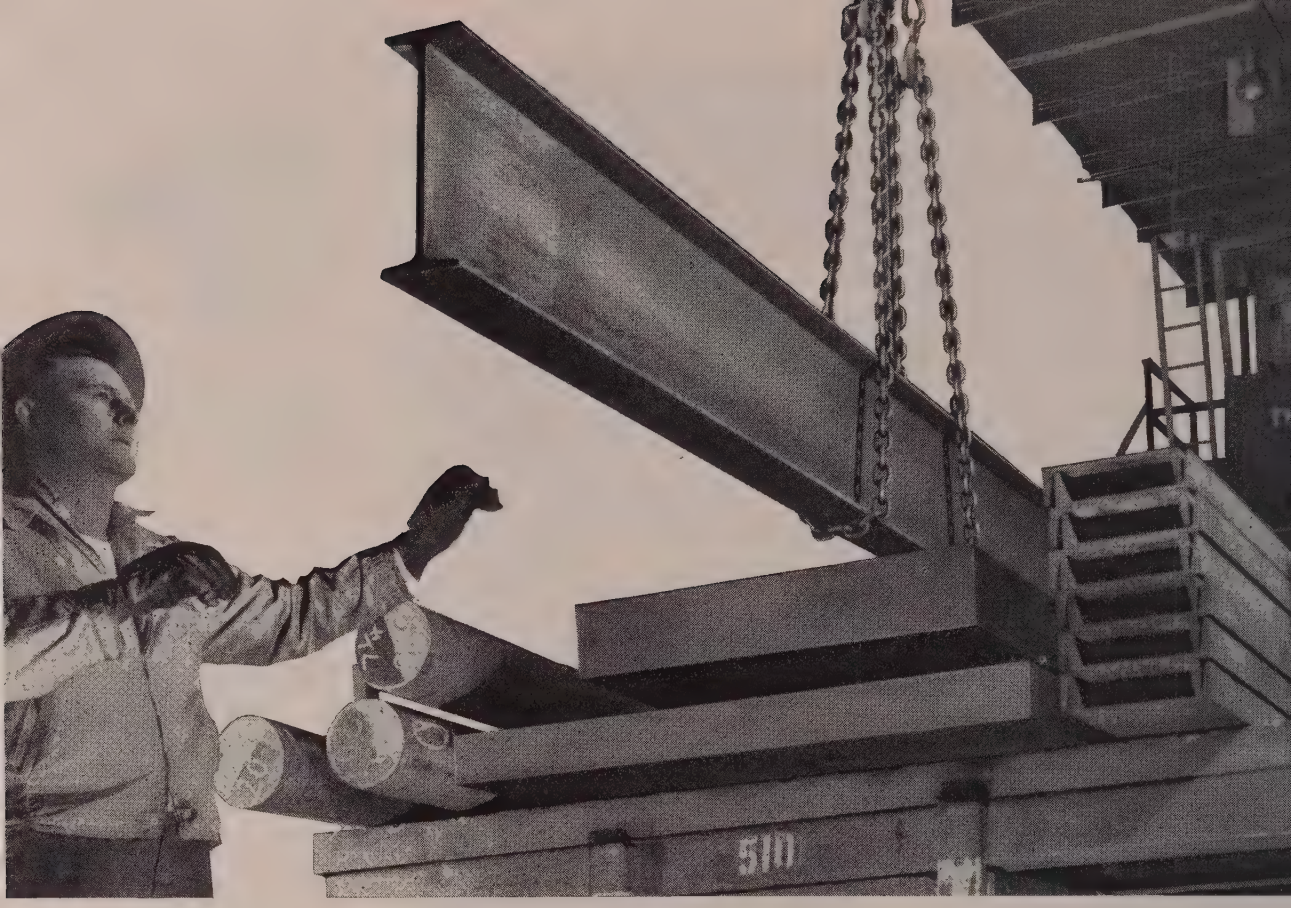


UNBRAKOs—made of heat treated alloy steel—have fully formed threads, Class 3 fit; have knurled cup point for positive locking. Are available in standard sizes from #4 to 1".

You can lower your inventory by using UNBRAKO Standards—stocked by your distributor

You'll have less money tied up in inventory, you'll get personalized service, faster deliveries. In addition, you'll reduce assembly time and increase production with these precision industrial threaded fasteners. Write for UNBRAKO Standards—a complete listing of socket screw products made by SPS and stocked by your local distributor. STANDARD PRESSED STEEL Co., Jenkintown 33, Pa.

UNBRAKO® SOCKET SCREW DIVISION SPS JENKINTOWN PENNSYLVANIA



Bars – Shapes – Plates

immediate delivery from world's largest stocks

You get *all* your requirements in *any* quantity when you call Ryerson for bars, shapes and plates. You also get steel of sound, known quality and steel service know-how that makes your job easier.

Need *bars?* Our stocks are the most diversified as well as the largest and every bar is ordered to a definite spec.—even bars often referred to as "mild steel" are quality controlled to AISI spec. C 1015 for best forming and welding qualities consistent with usual tensile requirements.

Need *structurals?* Here you find the most complete selection, including extra-long lengths. And, you can depend on square, practically burr-less friction saw cutting because of our special method of blade alignment and frequent blade changes.

Need *plates?* You get them here up to 10 inches thick. And shops which have had difficulty forming A-7 quality plates will be glad to know that Ryerson now carries plates of forming and welding quality.

The completeness of these stocks enables you to combine all your carbon steel requirements on one order for lower prices under the Ryerson quantity differential plan and for lower freight rates. So, whether you need a single beam or a carload, call Ryerson for immediate delivery from the world's largest stocks.

Principal products: Bars, structurals, plates, sheets, tubing, alloys, stainless, reinforcing, machinery & tools, etc.

RYERSON CERTIFIED STEELS

RYERSON STEEL

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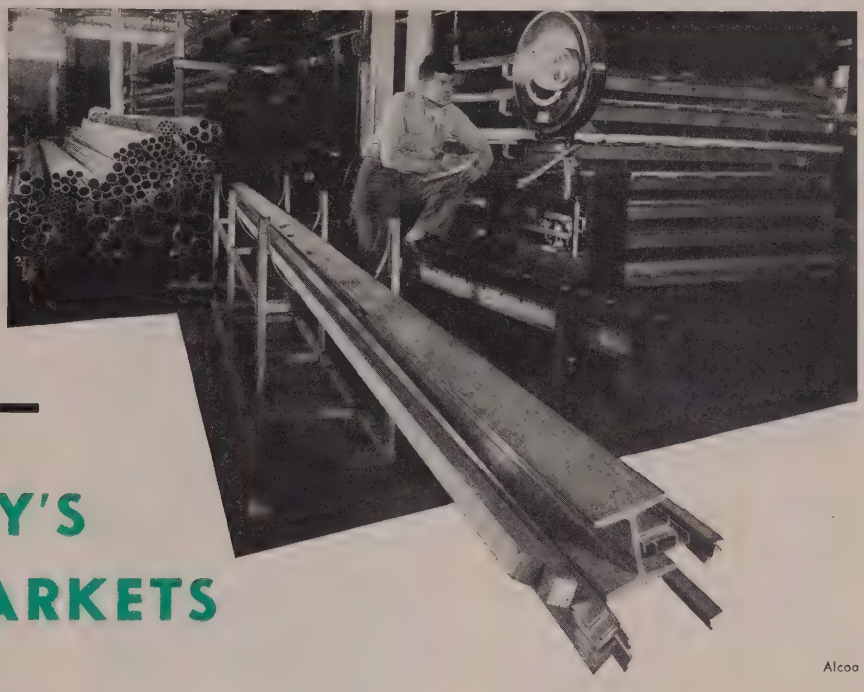


Alcoa

Warehouses—

INDUSTRY'S SUPERMARKETS

Warehouses are diversifying their stocks and adding more services. For steel buyers it'll mean fewer stops to get combination orders filled

EXPANDED SERVICE marks operations today in that industrial supermarket, the warehouse.

Steel suppliers are stocking more products, more sizes and are exploring possibilities of distributing nonferrous metals and products such as plastic pipe and sheet. Nonferrous warehouses are widening ranges of metals stocked, adding stainless and tool steels in some cases.

Fewer Specialists — This drive toward diversification of stocks is spreading through warehouses formerly stocking only a single metal or a single product. It adds up to greater efficiency of distribution, a phase of warehouse management often neglected during the "seller's market." Now fabricators can more often obtain all their metal requirements from a single distributor.

"Just as a supermarket carries cigarets to complete its line, steel warehouses are carrying new metal products to round out their stocks," says Don L. Ande, manager, warehouse division of Jones & Laughlin Steel Corp., Pittsburgh. "Result is better service to the consumer."

Pattern of Change — Diversification today follows several patterns, reports Jack Doxsey, assistant to the president, American Steel Warehouse Association, Cleveland. "While each warehouse operates under differing conditions, they generally are moving into allied metal fields, widening geographical coverage, expanding their lines by carrying more products and stocking a wider size range."

With metals finally in good supply, sales managers of such warehouse chains as Joseph T. Ryerson & Son Inc., report virtually full coverage on all items normally stocked. And Ryerson is expanding its service. In Cleveland the warehouse firm is adding plastic pipe supplies and a reinforcing bar department with fabricating facilities.

Broadens Stocks—Another firm to widen its supply of products is Hamilton Steel Co., Cleveland. President Ernest Harwell comments, "Within the past eight months we have broadened our line of aluminum, adding structural shapes, extrusions, truck body shapes and sections as well as fasteners."

Several New York distributors, formerly specialists in cold drawn bars and tool steel, now find it more profitable to include a variety of steel products. They are also doing much more slitting and fabrication. Why the extra service? "We must have both or all items on some combined inquiries to get any part of the order," sales managers answer.

New Metals—Diversification of service often leads steel warehouses to stock other metals. Says H. T. Wilder, manager of distribution, Aluminum Co. of America, Pittsburgh: "Warehouses stocking steel are growing increasingly more interested in aluminum products such as sheet, wire, rods, pipe and fittings, rivets and tube."

The same trend toward expansion of service appears in nonferrous warehouses. Williams & Co. Inc. is broadening nonferrous stocks in its chain of warehouses by stocking greater quantities of beryllium, copper and bronze, as well as a greater range of aluminum products, says R. C. Waldie, sales manager in Pittsburgh. Some non-

ferrous warehouses are already anticipating stocks of titanium.

Selling Stressed—This diversification of products and sizes would be pointless without a thorough selling job. "Warehouses need solid, long-range plans for buying and selling," comments Mr. Ande. With new warehouses established last year in Louisville, Ky., and Nashville, Tenn., J & L is extending its geographical coverage, too. Late last month that company completed a series of meetings in which warehouse personnel joined in Pittsburgh for forward-looking sales talks.

Diversification of products presents problems. "More capital has to be devoted to inventories," a Chicago distributor pointed out. "We would like to trim slow-moving items. We can't have customers who look to us for those supplies, although not in the volume which makes it profitable for us."

Market Surveys—Solution to the problem of maintaining a workable inventory lies in increased market research, which warehouses are undertaking to a greater extent. Results are only beginning to be felt in higher sales, but most warehousemen expect 1954 to be a good sales year, despite a slow first quarter.

Warehouse Gains Customers

Dolan Steel Co., Bridgeport, Conn., reports a 23.32-per-cent gain in new accounts for first quarter, 1954.

The warehouse's increased business came at a time when about one-fourth of the nation's steel purchasers were trying out new suppliers seeking better deals.

"Buyers find our new net delivered price schedule a great time saver," says James A. Dolan Sr. company president. "It's the first price schedule in the field designed to show at a glance exactly what customers pay for our steel delivered to their plant, and it makes unnecessary the computing of base, size and quantity extras."

Available Patents List Gets Ax

The Patent Office has decided to abolish the Register of Patents Available for Licensing or Sale. The reason: Lack of interest.

Investment Pays Off

Civilian jobs for investment castings have an unlimited future, ICI meeting hears

INVESTMENT CASTING foundries can consider their future as "just about unlimited," Frank C. Howard, chairman, Howard Foundries Inc., told the first regular meeting of the Investment Casting Institute in Cleveland, May 6.

Fansteel Metallurgical Co.

INVESTMENT CASTINGS SALES
. . . education for users is the key

But, to realize that future, the industry has a bigger-than-usual selling job to do.

War-Born and Concentrated—The investment casting industry got its big push during World War II and still does about 75 per cent of its volume in defense business. If defense work were to be drastically cut, the industry would naturally suffer a stiff setback. That fact, coupled with the lack of knowledge and appreciation of investment castings on the part of civilian and commercial customers, is the reason the industry is about to launch a broad educational sales program.

The industry-wide program will sell the properties and qualities of investment castings first. Investment casters are in process of setting up standards and specifications for materials and testing for themselves so that the story they tell other industries will be consistent. "Users have been led to believe investment castings are a cure-all. It will take a long education process to let other industries know what we can and what we can't do," said W. I. Matthes, executive vice president, Arwood Precision Casting Corp.

Beginning To Spread — Civilian markets for investment castings already include sewing machines, textile machines, food machinery in the form of stainless steel parts, office machines, vending machines, commercial instruments and gages, pneumatic hand tools, strapping tools, surgical and dental instruments, industrial cutting tools, photographic equipment and toys.

The 95 to 100 firms in the investment casting field had approximately $80 million in sales in 1953 and look forward to no more than 5-per-cent drop in sales for 1954.

Unscientific Hiring Costly

Unscientific hiring methods are "leaving employers with a staggering loss in dollars and worthless training," reports Industrial Psychology Inc.

The psychological research organization cited an American Management Association study which showed 42 per cent of 1167 college graduates hired by 247 companies proved unsatisfactory or left their jobs before the end of the first year. These "first-job washouts" cost the companies an estimated $1,347,500, more than $1000 per man.

To reduce washouts, Industrial Research recommends: Job tests measuring aptitudes; followups to assure the new man that he is progressing satisfactorily; vocational guidance information often available from schools.

Seaway's Next Step

Now that the St. Lawrence Seaway bill has been passed, the next step is creation of a St. Lawrence Seaway Development Corp. to administer the financing and construction of the seaway.

The corporation is authorized to sell up to $105 million in interest-bearing revenue bonds to the U. S. Treasury. This will be paid back in 50 years or less from corporation income.

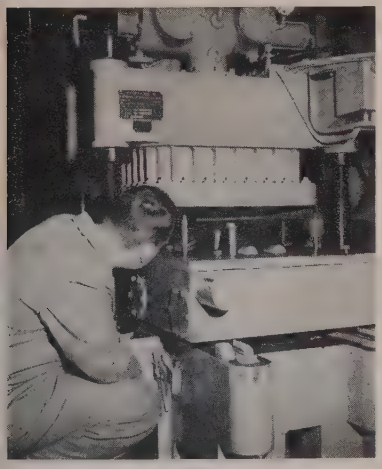
FRANK J. DOST
. . . new AFS president

Foundry Automation Trend Continues

"How to do it better, cheaper" theme dominates the AFS convention in Cleveland. Usual show frills give way to operative exhibits

WHOOP 'N HOLLER—convention style—on the surface, but beneath it all an attitude of "how can I do it better, cheaper." That was the climate of the 58th annual convention of the American Foundrymen's Society in Cleveland last week.

Business in the foundry industry so far this year has left much to be desired; and convention goers eagerly seeking ideas to better their plant and equipment



NEW EQUIPMENT, NEW IDEAS
. . . foundrymen looked long and hard

were not disappointed. Exhibit emphasis was on the "new and improved."

Operative Exhibits—Highlighting the show were the operative exhibits in which an interested foundryman could actually see the operations of a piece of equipment. Few phases of foundry work were omitted in the nearly $2 million worth of equipment displayed by about 300 exhibitors.

Breaking through the smoke and smell, pounding and grinding of the exhibits was a distinct sign of the times: The trend toward more automatic equipment designed to clean up the old-time foundry, lighten the workers' load and—more important—to cut costs and improve quality.

The Absent—Conspicuous by their absence were pretty girls passing out the usual gimmicks; instead serious-talking salesmen concentrated on new prospects. One exhibitor said at midweek: "Our booth has already paid for itself."

The convention sessions during the week were essentially technical in nature and the nearly 60 different meetings hit all phases of foundry technology. One of the newest developments discussed was General Motors Corp.'s use of transparent models to study fluid flow in molds to improve casting quality.

Officers—At its annual business meeting, the AFS elected Frank J. Dost, president of Sterling Foundry Co., Wellington, O., president and Bruce L. Simpson, president of National Engineering Co., Chicago, vice president. Directors are: William A. Morley, Olney Foundry Div., Link-Belt Co., Philadelphia; F. C. Cech, Cleveland Trade School; W. M. Hamilton, Crane Co., Chattanooga Div., Chattanooga, Tenn.; B. George Emmett, Los Angeles Steel Casting Co., Los Angeles; Harold L. Ullrich, Sacks Barlow Foundries Inc., Newark, N. J.; Charles E. Brust, Eastern Malleable Iron Co., Naugatuck, Conn.; L. H. Durdin, Dixie Bronze Co., Birmingham; E. R. Oeschger, General Electric Co., Schenectady, N. Y.; W. R. Pindell, Northwest Foundry & Furnace Co., Portland, Oreg.; J. T. Westwood Jr., Blue Valley Foundry Co., Kansas City, Mo.; C. B. Schneible, Claude B. Schneible Co., Detroit.

Protection Against Communists

Industry will get help in protecting itself against Communist infiltration from two pieces of legislation proposed to Congress by Attorney General Herbert Brownell Jr.

One bill, titled the "Communist-Infiltrated Organizations Act," would enable the Subversive Activities Control Board to dissolve any business enterprise or labor organization controlled by Communists and in a position to endanger the national defense or security.

A companion bill, titled the "Defense Facilities Protection Act," would give the federal government authority to bar subversives from work in civilian plants, power plants and other activities which could affect defense production.

Clark Forms Leasing Subsidiary

Clark Equipment Co. formed a new subsidiary, Clark Leasing Corp., to finance leasing of its equipment on a national basis. This long-range program follows

a six-month test period in which more than $2 million worth of industrial trucks were leased from Clark.

Under terms of the Clark Lease Plan, equipment is leased to the customer for a three or five-year period; effective simple interest rate for the leasing privilege is 3.79 per cent of the cost of the equipment. The customer is responsible for maintenance, insurance and any other costs resulting from the operation of the equipment. Options include one to extend the lease indefinitely at a low cost and another standard lease agreement for sale of the equipment to the lessee at the end of the rental term.

Mathieson, Olin Propose Merger

Boards of directors of Mathieson Chemical Corp. and Olin Industries Inc. last week approved a proposed merger of the two companies. The proposal will be submitted to stockholders of each concern next month.

Based on 1953 figures, the combined corporation will have total assets of about $500 million and yearly sales of over $500 million.

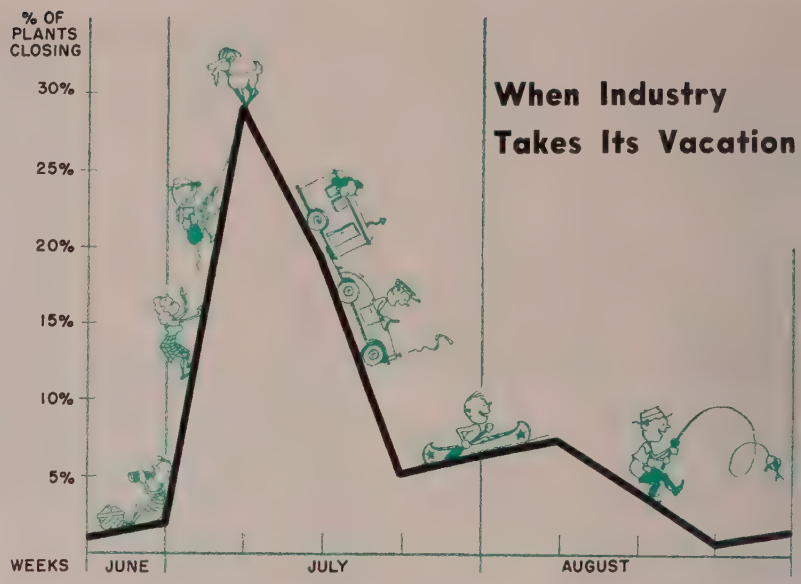
Glassed Steel—Made in Japan

U. S.-designed, made-in-Japan glassed-steel and alloy equipment for chemical, pharmaceutical, food, beverage and other industries will be available in the Far East under a Shinko-Pfaudler Co. Ltd. label.

Annual business of $3 million is expected for the new company, jointly owned by Pfaudler Co., Rochester, N. Y., and Kobe Steel Works Ltd., Kobe, Japan.

Small Business Aid Extended

The joint determination program for small business procurement assistance will be revised and extended under a new agreement between Department of Defense and Small Business Administration. Procurements involving $10,000 or more will now be subject to "set-asides" for exclusive performance by small concerns; the previous minimum had been $25,000. Also, when bid sets specify purchases are restricted to small firms, only bids from small firms will be considered.



Vacations: Shutdown Trend Slows Down

COMPETITIVE BUSINESS conditions will slow down—but not stop—the trend toward complete plant shutdowns for vacations this year.

Some industries and some communities definitely are shying away from shutdowns: In Pittsburgh, less than half of the firms surveyed indicated they would close up completely this year, reversing the trend of the past few years; several primary steel producers indicate steel operations will slow down less than usual for vacations in 1954 because "business won't wait two weeks."

Plant Openers — Other reasons given for a shift from shutdowns to staggered vacation periods were production slowdowns earlier in 1954 which put a dent in output that must be made up later in the year, employee "borrowings" from vacation pay during first quarter slowdowns in plant operations leaving fewer employees eligible for full vacations, and lower backlogs of work that mean these plants are working too near delivery dates to close completely.

Nationally, however, there will be a probable increase of 15 per cent in the number of manufacturing firms closing down completely. Word of economies in having all employees stop working at the same time and return to work at the same time continues to spread. And there'll be a 5 to 10-per-cent increase in the number of plants closing for three instead of two weeks. That's the combined result of requirements for three week vacations dropping back slowly from 20 to 25 years' to 15 years' employment and the fact that layoffs have increased average seniority in many plants.

Familiar Peaks—Timing of vacation periods won't change in 1954, though. The most popular time is the first two weeks in July with the second two weeks in July the next.

Management, considering plant shutdowns for 1954, might well look ahead to pitfalls which are developing in the practice.

Growing Burdens—A one-week shutdown may be feasible this year, but will a two or three-week shutdown work out as well a few years hence as vacations get longer? One of the primary aluminum producers notes that in some of its older plants as many as 70 per cent of its workers get three weeks off. This firm says it must stagger its vacations.

As more plants shutdown for vacations at the same time each year, more workers come back home with bitter tales of crowded accommodations and clogged roads. Should the trend toward shutdowns continue at anything like its past rate, present discontent could grow into mutinous discord. At that time, industries and communities will have to get together to stagger their shutdowns.

Ribs are aligned in jig . . .

Bilge plates riveted on . . .

Aluminum Rides the Waves

ALL-ALUMINUM cabin cruisers that require no painting and almost no maintenance are being manufactured deep in the heart of Texas.

Lone Star Boat Co., Grand Prairie, Texas, got into the cruiser-building business through aluminum craft it built for the U. S. Coast and Geodetic Survey. Boat enthusiasts wanted copies. Lone Star, which had been building small aluminum boats for years, complied with the 21-foot aluminum "Cruise Master" which sells delivered for about $1800, weighs only 950 pounds. Another $1200 will buy outboard motor, galley, toilet, flying bridge and trailer.

Kaiser aluminum is used throughout. Styrofoam insulation makes the cruiser almost unsinkable.

Buoyant insulation tucked in . . .

The deck and cabin shell added . . .

Then, final assembly in the yard

T-H Revision Dies

No tears shed by employers; the proposals would have weakened the law

SENATE ACTION recommitting the Taft-Hartley revision bill last week brought a sigh of relief among employers.

Reason: Passage of the bill would have weakened the labor law rather than curing present inequities. Chances for enactment of the bill this year are nil.

Poor Likeness—Purporting to be the administration bill, it conformed to President Eisenhower's recommendations in form but not in spirit. Weaknesses were:

1. The Schoeppel amendment which would have tightened the ban on secondary boycotts was missing; instead the bill relaxed the ban considerably.

2. Missing, too, was the Goldwater amendment to authorize states to pass laws dealing with labor emergencies or "any other case", except laws that permitted employers to interfere with rights guaranteed employees under T-H. This would have taken labor matters largely out of national politics and assigned them for solution to the people "back home" immediately affected.

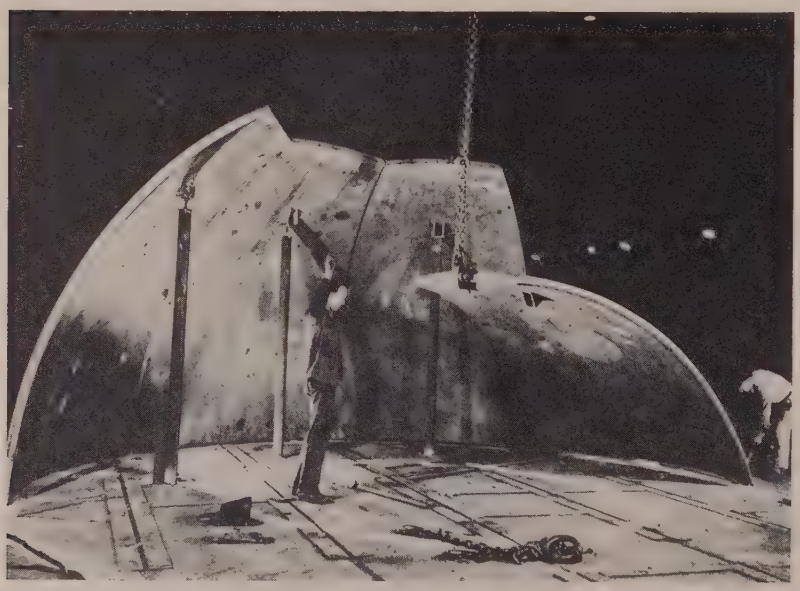
3. The Purtell proposal for secret government-sponsored prestrike vote, supported by many employers, was not included in the revision either.

Sideline opinion is that there won't be a labor law revision satisfactory to employers as long as labor follows the relatively strike-free pattern of last year.

Tool, Die Subcontracts To Stay

Automotive and appliance industries are most active in buying special tooling, trustees of National Tool & Die Manufacturers Association report. But the reports show business conditions in the tool and die industry varying widely.

Defense department officials at the association's spring meeting said the department intends to continue to have prime contractors subcontract special tooling wherever outside shops are better-equipped to handle it—rather than add government-owned equipment to prime contractors' toolrooms—and wherever the contract shops can do the work cheaper. This is aimed at keeping the industry as strong as possible.



Orange-Peel Plates Dome Refinery Vessel

Big "orange peel" section plates of carbon-moly steel, rolled and formed by Lukens Steel Co., Coatesville, Pa., form bottom head of a reactor vessel being joined together at shops of its designer, M. W. Kellogg Co., Jersey City, N. J. The vessel will form the heart of a fluid catalytic reformer for a midwest petroleum refinery; topped by a smaller vessel it will stand over 200 feet high

Road Building Spurred

Boost in federal highway aid brightens market prospects for many metalworkers

NEW ZEST has been added to the market outlook of metalworkers supplying the road construction industry.

President Eisenhower signed the Federal-Aid Highway Act of 1954 which authorizes a 2-year government expenditure of $1.9-billion on the nation's highways in fiscal 1956 and 1957.

The Timing — Significance to metalworkers is this: The action sets the yardsticks by which state highway officials can begin planning their construction and repair programs on a matching basis; metalworkers can help promote these programs. The bill is merely an authorization for aid; appropriations are still to be made.

Highway construction steamrolled to a record $3.2 billion last year, and the prospects for equalling the expenditure this year are good (see STEEL, Jan. 18, p. 41). Current active program, according to Commerce department figures, includes 31,189 miles of highway at an estimated cost of $2.5 billion—$1.5 billion of which is federal money.

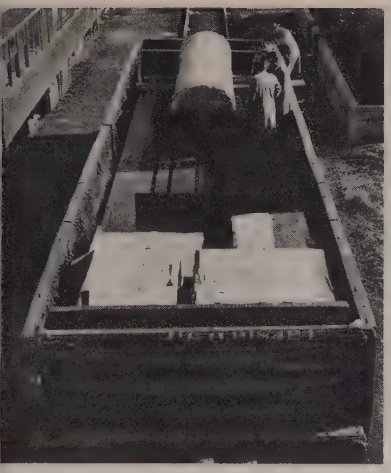
The Increase—The new act represents an increase of $300 million per year over current federal aid for roads. Officials say the funds with matching state money will make possible improvement and modernization of 40,000 miles of highway.

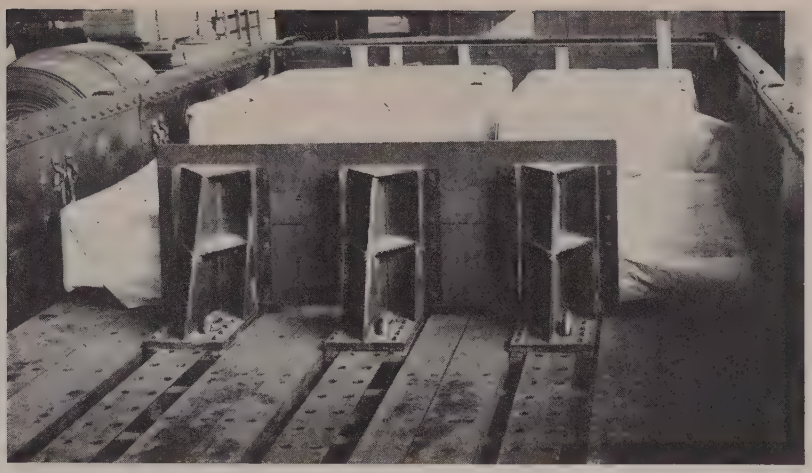
In addition to the fund authorization, the new legislation provides for broad authority for a research program relating to highway design, construction, financing and use.

What Uncle Sam Buys

Everything from women's girdles to burial urns are listed in Uncle Sam's new purchasing directory just out and available for 50 cents from Superintendent of Documents, Washington 25.

"U. S. Government Purchasing Directory," says small Business Administration, makes it easy for the businessman to learn who is





Double-Ended File Drawer for Lower-Cost Steel Shipments

Gondola car with movable bulkheads to carry steel at lower cost without damage has been announced by the Chesapeake and Ohio Railway. Bulkheads work on the principle of file drawer partitions, eliminate much need for blocking

the government buys what and where. Listed are some 4000 classes of commodities covering the 5 million items purchased by both civilian and military agencies.

Also included in the directory is a section on how to go about selling to the government. A companion piece now being revised, "U. S. Government Specifications Directory," will be available soon.

Selenium Salvage Suggested

The Selenium Rectifier Stack Manufacturers Industry Advisory Committee has asked the government to consider reclaiming government - owned selenium - bearing scrap before it makes stockpile purchases from the open market. IAC members said there's an extreme shortage of high purity selenium which may become aggravated in 1954 because of shutdowns of American copper mines.

FTC Amends Consent Procedure

Aiming at more speed and economy, Federal Trade Commission amended its rules to allow more use of consent orders in litigated cases.

Under the amendment—effective May 24—consent settlements no longer have to contain findings of fact; can be entered at any stage of proceedings; don't have to settle all issues involved; and can be accepted or rejected by hearing examiners, subject to Commission review.

Fair Trade Changes Are in the Offing

CHANGES in fair trade statutes are predicted by Federal Trade Commissioner Albert A. Carretta.

Most likely candidate for revision is section 5(a)(5) of the McGuire act which is, he told the Practicing Law Institute in New York, "admittedly ambiguous" and "the one which has caused most concern to the commission." This section, he said, "in effect is an exception to the exemption provided in section 5(a)(2) of the same amendment."

Not in Violation — Section 5(a)(2) provides that whenever certain pricing agreements are lawful in intrastate commerce under state statute those agreements are not in violation of either the Federal Trade Commission act or any of the antitrust acts.

But section 5(a)(5) says, "Nothing contained in paragraph (2) of this subsection shall make lawful contracts or agreements providing for the establishment or maintenance of minimum or stipulated resale prices on any commodity referred to in paragraph (2) of this subsection, between manufacturers, or between producers, or between wholesalers, or between brokers, or between factors, or between retailers, or between persons, firms or corporations in competition with each other."

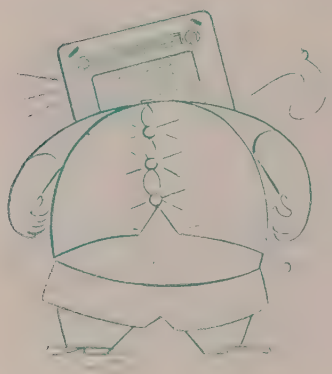
Competition, the Test—In Mr. Carretta's opinion, "As to these particular enumerated pricing agreements, it is just as though the McGuire act amendment was never enacted." And, he says, as things stand now, the only way the commission can determine if a minimum resale price fixing agreement violates the Federal Trade Commission act is to determine whether the contracting parties are in competition.

So he predicts, "Our courts will in the not too distant future review the statute and hand down a decision which will then be binding upon the commission. Of course, there is also the possibility that the Congress may act in an attempt to clarify this language of the McGuire act."

Distributor's Actions Proper

A distributor's association formed to combine purchasing power so as to obtain favorable prices and terms is not engaged in unfair competition. With that decision the Federal Trade Commission dismissed a complaint against the Associated Greeting Card Distributors.

The commission concluded that "a few small concerns have joined together as buyers in a noncollusive effort to wage competition, not to restrict it." The association was found not to be in a monopolistic position.



FCC Dilemma: How to Give Industrial Radio a Bigger Slice of the Air Waves

GROWING PAINS for the Federal Communications Commission's industrial radio service are getting more severe.

As the volume of applications for new service continues to increase, so do the objections to the FCC's proposed new rules limiting industrial radio eligibility. Overloading the channels is the problem, particularly near large population centers; FCC would offer a shiny new frequency for a solution.

With cost cutting gaining momentum in the face of today's high unit wages, radio is one of industry's effective new tools (see STEEL, Feb. 8, p. 108). Industrial radio dates back only to 1949, yet there are now 6066 industrial licensees equipped with more than 150,000 transmitters. About 2000 licenses were granted last year alone, and the rate of new applications is increasing.

That's the reason for the proposed new rules and the resulting objections. FCC seeks to prevent or postpone indefinitely channel overloading by controlling eligibility.

Industry's Problem . . .

Take the steel and metal fabricating industries. They use radio for directing materials handling and other operations in the so-called "yard areas"—the area within the physical limits of the plant premises. The proposed new "Special Industrial Radio Service" rules leave unresolved the matter of communications with mobile units once they have left the yard area.

Another complaint is that both present and proposed new rules call for a base station in each separate noncontiguous yard area; these bases, however, are prohibited from talking with each other except in an emergency or on a matter of security.

The steel industry would like complete control from a single base station over the associated mobile units of all of the yard areas and to be able to talk from a single base to all mobile units within communication range whether in yard area or not.

FCC's proposed new rules would also make certain presently eligible functions ineligible. Delivery of transit-mix concrete, liquefied petroleum gas and the movement of trucks for maintaining heating and refrigerating equipment would be allowed use of radio. But the light construction industry—electricians, plumbers and similar contractors—would get the boot. Government contractors no longer would get

consideration as such, but they would be eligible only when engaged in "heavy construction" as defined by the new rules.

The Trend . . .

To make the supply of spectrum space go around, the trend is toward nonexclusive allocation of frequencies to facilitate better utilization on a geographic basis—with uses in certain categories tending to balance uses in others. That's the reason FCC turned down the request of the Committee on Man-

ufacturers' Radio Use for allocation of certain frequencies for exclusive use by industry. FCC held that the plan would be inherently wasteful because such frequencies would be largely unused in rural sections of the country.

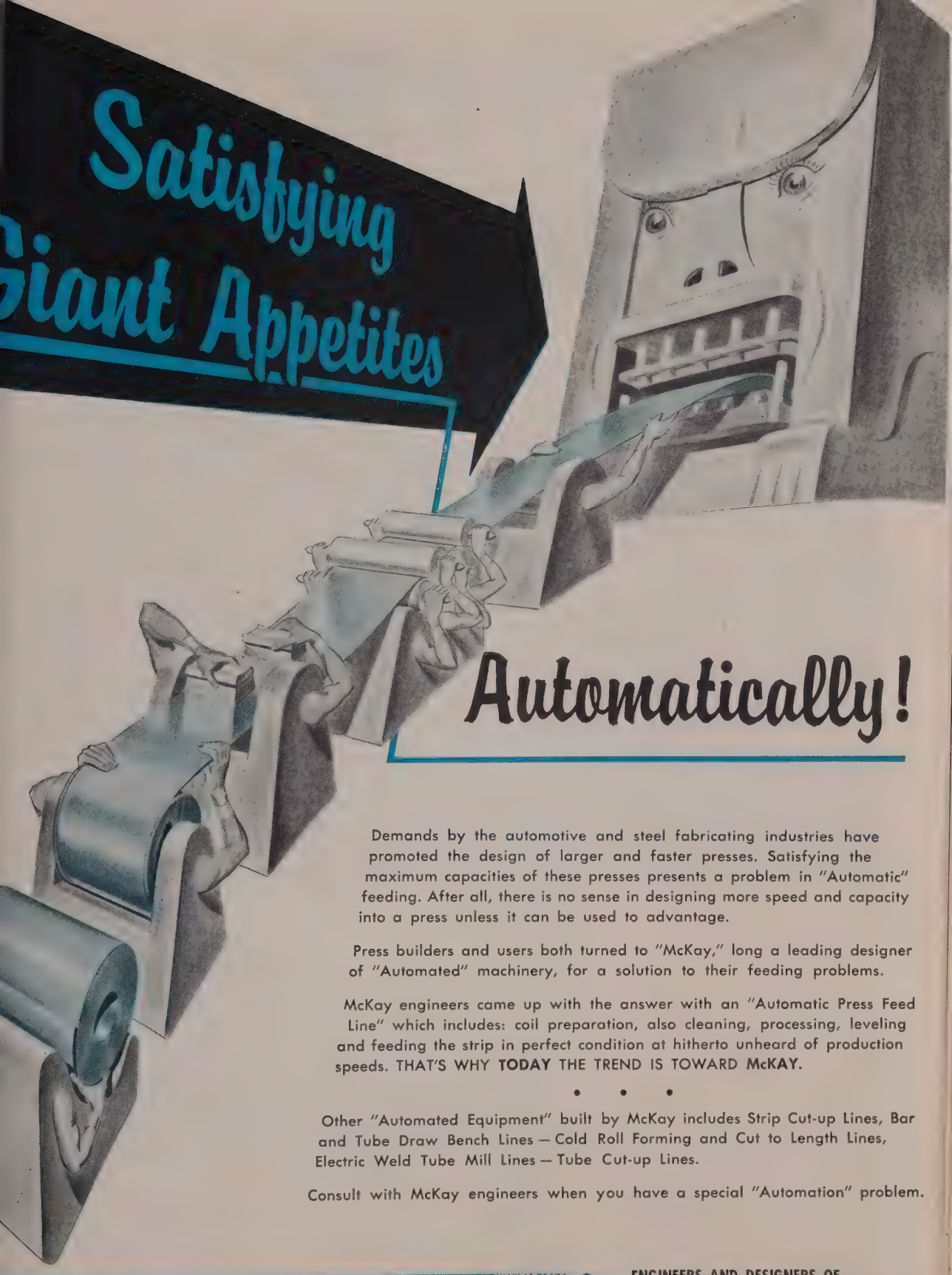
Users claim one way of making more frequencies available to industry would be a resort to "split-channel" operation, calling for a 20-kilocycle separation instead of the present 40-kilocycle spacing in the VHF band. FCC has held up on this due to engineering considerations such as the problem of equipment obsolescence. Some splits have been authorized on a developmental basis, so some help may be forthcoming as more experience is gained.

Restrictions Aren't the Answer...

A quick cure to the industrial radio growing pains isn't in sight. Jeremiah Courtney, former FCC legal staff member now specializing in industrial radio cases in private practice suggests:

"The ultimate answer to these problems will not be found in increased restrictions. Better methods of assigning unused frequencies on a spot-area basis would seem to be the least disturbing answer at present, although even that would require a larger staff and engineering budget for the FCC. Otherwise, broadcast space, such as the largely unused 88-108 megacycle FM band, will have to be reallocated to mobile users if our industrial progress is not to be hampered by a radio-frequency roadblock."

Satisfying Giant Appetites



Automatically!

Demands by the automotive and steel fabricating industries have promoted the design of larger and faster presses. Satisfying the maximum capacities of these presses presents a problem in "Automatic" feeding. After all, there is no sense in designing more speed and capacity into a press unless it can be used to advantage.

Press builders and users both turned to "McKay," long a leading designer of "Automated" machinery, for a solution to their feeding problems.

McKay engineers came up with the answer with an "Automatic Press Feed Line" which includes: coil preparation, also cleaning, processing, leveling and feeding the strip in perfect condition at hitherto unheard of production speeds. THAT'S WHY **TODAY** THE TREND IS TOWARD **McKAY.**

• • •

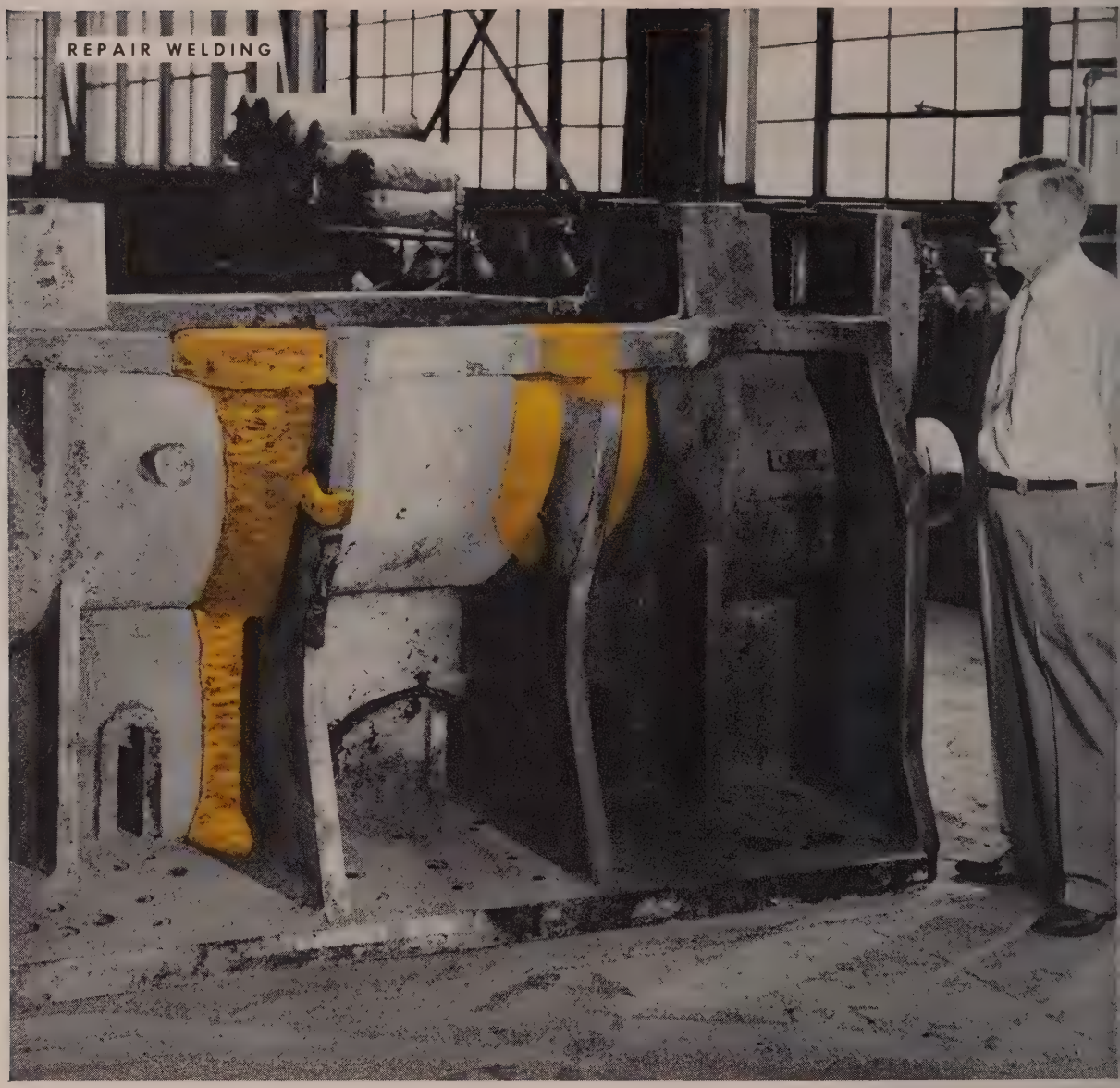
Other "Automated Equipment" built by McKay includes Strip Cut-up Lines, Bar and Tube Draw Bench Lines — Cold Roll Forming and Cut to Length Lines, Electric Weld Tube Mill Lines — Tube Cut-up Lines.

Consult with McKay engineers when you have a special "Automation" problem.

McKAY MACHINE *Company*
YOUNGSTOWN, OHIO

McK

ENGINEERS AND DESIGNERS OF EQUIPMENT FOR THE AUTOMOTIVE, FABRICATING AND STEEL INDUSTRII



"Don't scrap it . . . braze-weld it" paid off handsomely when this inner ram was twice repaired.

Braze welds twice save press part from scrap heap

This is the inner ram of a 500-ton press for shaping automobile fenders, quarter panels, floors, etc. It weighs 10 tons.

Twice it cracked, in different places. And twice braze-welding repaired it. It would have cost thousands of dollars to replace this part.

Punch Press Repair Corp., 1975 Hilton Road, Ferndale 20, Michigan, did both jobs. Each time they used Tobin Bronze*-481 Welding Rods. They say, "Welding with Tobin Bronze saves us time. It's economical and dependable, too. Braze welds need less preheating . . . high stresses don't build up. Tobin Bronze flows freely, 'tins' quickly, gives strong, sound bonds."

Tobin Bronze-481 Welding Rod is widely used for repair welding of cylinders and other locomotive parts . . . automobile engine blocks . . . cast-iron pipe . . . machinery parts and other equipment.

ANACONDA Welding Rods for *many* types of repair and production jobs are available from distributors throughout the United States. *The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.*

*Reg. U. S. Pat. Off. 54137

ANACONDA®
welding rods

AnacondA Copper-372 • Tobin Bronze-481 • AnacondA-997 (Low Fuming) Bronze • Nickel Silver-828 • Cupro Nickel-826 • Everdur-1010 • Ambraloy-928 • Phosphor Bronze-351 • Phosphor Bronze-354

West Europe's Trade Turning East

Trade between East and West Europe is becoming more appealing as competition increases in world markets. It will rise 10 to 30 per cent in 1954

EAST-WEST TRADE increases appear inevitable — mainly because Western Europe finds such trade an excellent escape valve for surplus manufactured goods and needs the products being offered from behind the Iron Curtain.

Such trade never ceased completely after World War II but in 1949 amounted to only one-third of the 1938 total; by 1953 the volume had shrunk roughly one-fifth again from the 1949 total.

Headed Up—In the latter half of 1953, however, the East-West trade trends reversed themselves and nearly all Western European countries (Belgium and Luxembourg were the exceptions) increased their exports to these markets.

From first to second half, 1953, United Kingdom shipments rose $16 million to $27 million; West German exports rose $24 million to $30 million; Netherlands exports climbed $15 million to $42 million; Italian shipments went up from $24 million to $34 million; and even France's exports rose from $25 million to $26 million. Total exports to Eastern Europe amounted to $335 million in the first half, 1953, and $454 million in the second half.

More Ahead — This reversal seems certain to continue in 1954. New trade agreements already concluded in 1954 indicate a 10-per-cent rise in dollar value from the 1953 agreements. If these new agreements are fulfilled completely the rise in trade would be more like 20 to 30 per cent over 1953 when not all quotas for export to Eastern Europe were completed.

Going behind the Iron Curtain in larger quantities will be heavy industrial equipment, machinery and transportation equipment. Trawlers and refrigerated ships have been ordered by the U.S.S.R. in several Western European nations. Imports from Eastern Europe will include coal, petroleum and petroleum products, timber, pig iron and cotton.

Tariff Bill Gets Cold Shoulder

H.R. 8860, introduced by Rep. Robert W. Kean (Rep., N. J.) as the administration's foreign economic policy bill, is meeting a "Congressional cold shoulder," says the American Tariff League. The bill would extend the Trade Agreements Act to June 30, 1957; would authorize U. S. officials to negotiate trade agreements providing for new tariff cuts on commodities which have already been cut the maximum of 50 per cent allowed under existing law. It specifies that the additional cuts could not exceed 5 per cent a year for each of three years, or a total of 15 per cent.

Present outlook is that the best to be expected is a simple extension of the existing trade agreements bill, giving the President no further tariff-reducing authority.

Japan Trying To Balance Trade

Japan is busily lining up customers for 1954 business, some new and some old.

Under a trade agreement with France, Japan will export $28.9-million in goods to that country and import $24.4 million in goods from there. Last year, without an agreement, Japan bought $59.1-million in goods from France but only sold that country $23.7 million in goods.

Japan and the Chinese National Government in Taiwan approved a one-year extension of the Sino-Japanese trade agreement for $74.5 million in trade each way.

A new agreement with Canada is expected to open the way for more exports to there from Japan. In 1953, Japanese exports to Canada totaled only $15 million against imports of $104 million from Canada. But this year Japanese imports into Canada will get most-favored-nation tariff treatment instead of being subjected to general tariff rates, which are Canada's highest.

More Aluminum from Norway

Norway's largest aluminum plant at Sunndalsora began operation last month. Financed in large part by a U. S. Economic Cooperation Administration loan, the plant has an initial production capacity of 40,000 tons a year. At present, Norway's aluminum output is about 52,000 tons a year.

Brazil Prepares To Produce Carbides and Tool Steels

Being briefed in the sintering department of Firth Sterling Inc. are Dr. Luiz C. Correa Da Silva (center) and Dr. Vincente Chiaverini (right) of a newly formed Brazilian firm, Brassinter S. A. W. R. Davis, sintering department general supervisor is doing the explaining. Brassinter will eventually become Firth Sterling's counterpart in Brazil, producing sintered tungsten carbides from local raw materials and tool steels. Equipment will be bought in the U.S.

Tank Plant Mothballed for Quick M-Day Conversion

ARMY ORDNANCE officials hail a Ford Motor Co. equipment storage plan as a model for quick conversion from civilian to military production.

Ford stored in a new warehouse all M-48 tank production equipment from its Livonia, Mich., plant. In an emergency, the 5500 major items of equipment and some 15,000 smaller items can be put into peak production in about half the time formerly required.

Ford will manufacture and assemble automatic transmissions at the Livonia plant once new equipment being installed is ready.

Tools are skidded, painted, moving parts given preservative treatment to ready them for long storage

Ford quality control and plant engineering men check tank-producing machinery at government warehouse

Positioners formerly used to rotate tank parts during welding operations are inventoried at warehouse

Machine tools, fixtures, other equipment used to produce M-48 tanks await shipment to layaway warehouse

Floor space and packing costs are cut by using tank plant racks for storage

The trend is to mechanize paperwork, and an industry is shaping up which within five years expects to supply $1 billion worth of electronic computers yearly to achieve . .

Remington Rand

Office Automation: New Frontier To Cut Costs

AUTOMATION in the office?

For clerical routines yes, for decision-making functions no.

Management Tool — Electronic computers offer management a significant operating tool. Complete and current information allows management to make sound decisions quickly. Orders can be put into production in a fraction of the time now required. Areas that stand to benefit most from application of computers are: Production and inventory control, sales forecasting, market research, order processing and billing, payroll and cost distribution records, accounting and financial compilations.

Opportunity — Besides altering many existing office organizations and methods, electronic computers offer a golden future to office machinerymakers. John E. Parker, vice president in charge of computer sales, Remington Rand Inc., predicts it will be a $1-billion industry in five years.

About a half-dozen companies are prominent in electronic computer manufacture today, with another dozen engaged in making specialized equipment. International Business Machines Corp., an early starter, has built more than 2000 of one model computer to date.

In Use—While practical operating experience is needed to prove out many commercial applications, industry has been quick to recognize possibilities. General Electric Co. last month put into use a $1-million digital computer—Remington Rand's Univac—at its Major Appliance Division in Louisville. GE expects to save $500,000 yearly over cost of conventional procedures when the system is fully operating.

Monsanto Chemical Co., with an IBM card-programmed calculator, reports its financial statements, which formerly consumed about 40 man-days in manual preparation, are now produced in six to eight hours, allowing reports to be made ten days earlier than formerly.

Coming Up—New developments coming rapidly promise to broaden the computer's application. A magnetic library system to replace filing cabinets is promised by Logistic Research Inc., Redondo Beach, Calif. According to physicist Glenn E. Hagan, LRI president, the innovation couples cost accounting directly with time clocks. It permits customer credit to be checked instantly, instantaneous addressing and production control systems to be set up and perpetual inventory systems to show immediate stock on hand.

Another needed device is printing equipment that can match the thinking speed of the big brains. Burroughs Corp. has developed a machine that will print 43,000 characters a minute. It can operate 108,000 punched cards in an hour and turn out 27,000 paychecks.

Common Language—Completely new concepts of data processing will be required if business is to make most efficient use of electronic knowledge. United States Steel Corp. developed a "common language" system to transfer raw data between various types of office equipment (STEEL, Mar. 15, p. 63). Thus different types and manufacture of machines are made compatible. The system can be used by companies with as few as 350 employees.

Cost in the Sky—As most electronic calculating machines are expensive and new refinements are developing rapidly, leasing is a common way to use them. Cost of leasing ranges from about $550 a month for a single unit to around $25,000 for an entire system. On outright sale, price tags run from about $50,000 to over $1 million.

Another possibility is in contracting for their services. Universities are likely to have time available if they own a machine, and service bureaus maintained by equipment manufacturers take on job work.

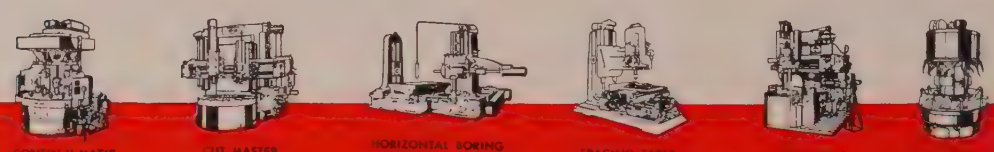
where *Endurance and Accuracy* count . . .

Choose a BULLARD

Have your BULLARD Representative explain the many features of

. . . The Vertical Chucking Grinder

The combined use of mechanical, hydraulic and electrical components provides the accuracy, flexibility, power and ease of operation so essential in precision grinding on larger sizes of work. The Bullard Vertical Chucking Grinder is available in six sizes from 30″ to 74″, made to meet every present day requirement.



THE BULLARD COMPANY • BRIDGEPORT 2, CONN. Telephone 6-251

Auto Output Sets Fast Pace in First Four Months; Curve Warning Ahead

DETROIT

ONE of the oldest tricks in auto racing is to push your competitor into a curve too fast. There's a curve ahead in the auto production race and the leaders appear reluctant to back off.

That raises the question of whether there may not be a second-half spinout in auto production, an eventuality contingent upon two major factors: How fast you're moving and how sharp the curve is. In auto racing, where both are tangibles, getting through the curve successfully is still somewhat a seat-of-the-pants matter. In the auto production race, where neither is tangible, the art becomes proportionally greater.

Too Fast?—Perhaps the best indication of both the speed of the industry and the curve ahead are provided by the last "normal" auto production years of 1935-1939. During that period as a whole, the composite factory sales curve shows 36.5 per cent of production during the first four months of the year. Applying that curve to 1954 with a production of 2.3 million cars and trucks through April indicates the auto industry is headed for a 6.4-million lap in 1954.

The problem is whether or not this is a 6.4-million race course.

Although such factors as record-high consumer savings and near-peak employment may be cited, other observers point out that ability to buy is not so important as willingness to buy. They cite a dip in auto paper early this year, sluggishness in used car sales and postwar-high stocks in new car dealers' hands as indicative of the fact that Detroit is steering an unrealistic course.

One Thing Sure — Whatever course Detroit is on is beginning to get bumpy. You can now buy nearly every make of car at discount in most areas including the three sales leaders, Ford, Chevrolet and Buick. Possibly the sole exception is Cadillac which continues to follow a sales position definitely not the "standard of the world."

Suicide Course — As the chart below shows, cutting prices can be a very quick way to suicide. The extreme shown on the chart, a 20-per-cent cut, is hardly unusual today and dealers who aren't handling the indicated increase in volume are taking a consequent drop in profits. That impact on the ultimate dealer health of even the largest volume makes is something the automakers are forced to conjure with.

The independents and Chrysler, already choked with the leaders' dust, have answered with reduced production schedules. And although Ford and GM together have upped their last-year percentage of January-April output from 67 per cent to 78 per cent this year, many observers feel the time is at hand when they will also have to let up on production for the sake of their dealer organizations.

Sharp Curve Ahead—With some popular-make dealers reporting 30-day inventories, that time does not appear to be far ahead. The automakers had hoped through pressure to make their dealers activate the demand for new cars. Thus far the result has been only a price cut on the part of many dealers and an increase in buck-passing bootlegging.

Yet in one case, a man actively seeking a new car and asking questions which could leave no doubt of his earnestness was greeted with answers betraying a fundamental ignorance of the product. Not only did none of the dealers try to get him into the car, the first rule in new car selling, but in the four months following

HOLDING THE PROFIT LINE

THE effects on gross profits of even slight price cuts were described at the U. S. Chamber of Commerce's annual meeting in Washington this week.

The Chamber used the following illustrations:

A retailer who wishes to keep his gross profit at 30 per cent and makes a 5-per-cent price cut must increase his dollar volume 14 per cent and handle 20 per cent more merchandise.

If the same retailer makes a 15-per-cent cut, he requires 70 per cent more dollar volume and must handle 100 per cent more merchandise. Expressed in a table:

GROSS PROFIT	PRICE CUT	INCREASED $ VOLUME	INCREASED MERCHANDISE
30%	5%	14%	20%
30%	10%	35%	50%
30%	15%	70%	100%
30%	20%	140%	200%

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his contact with the dealers not one has attempted to follow up and find out whether or not he still wanted a car.

Factories Check Dealers—Factories today are having representatives make such calls on dealerships impersonating customers and submitting reports to the dealer on how his men could improve. Courses for salesman training and dealership management are being set up, but it will take some time for such measures to bear fruit. In the meantime, price cutting is the modus operandi.

The chart makes it clear that price cutting is a serious business. In the face of that threat, it seems likely that cuts in auto production will be forthcoming. And since the industry is already on its 6.4-million schedule, it seems probable that the estimated goal will not be reached.

The proposed investigation into GM and Ford for "undue concentration of power" as cited by Attorney General Brownell is largely an academic matter. There can be no argument that these companies have gained a share of the market at the expense of their competitors, but the tenability of those gains is a matter yet to be established.

The auto industry creates a dramatic case that hard production must go hand in hand with the hard sell, for GM or Ford or you.

Fisher Body Plastics Plants

More than the usual interest is due a General Motors announcement that it will build a new Fisher body "fabricating plant" on the site razed by the Detroit Transmission Plant fire in Livonia, Mich. For although GM is unusually evasive on the subject of what will be produced in the new structure, Lewis J. Lamm a former staff engineer in plastics development is announced as plant manager.

This sounds conspicuously like plastic bodies and/or plastic tooling will be produced in the plant. In view of the fact that Franklin H. Sherer is appointed production manager of the plant and Mr. Sherer's past experience includes a stint as Fisher body's engineer in charge of tool planning and processing, plastic tooling seems the more likely prospect.

Then comes the last paragraph of the release which notes "Fisher Body—Livonia will fabricate components for General Motors Passenger cars." Are tools components?

Anyhow, there are the facts—you figure it out. One thing for sure, production will start soon in the 200,000 square feet presently available for operations at Livonia with an addition of 628,000 square feet to be finished early in 1955.

Auto, Truck Output

U. S. and Canada

	1954	1953
January	594,789	614,000
February	573,801	628,017
March	672,485	752,149
April	675,980	782,491
May		685,390
June		713,206
July		757,595
August		641,152
September		605,228
October		651,153
November		457,852
December		529,588
Total		7,817,821

Week Ended	1954	1953
Apr. 10	152,074	176,783
Apr. 17	148,559	162,171
Apr. 24	157,710	194,610
May 1	159,206	184,800
May 8	155,909	179,621
May 15	158,000*	177,305

Source: Ward's Automotive Reports.
*Estimated by STEEL.

$100 Battery by Chrysler

A $100 price which sounds more like assault than battery is announced this week by Chrysler for a new 6-volt unit. The gimmick—it's a nickel-cadmium job being offered for the first time which will last 10 to 15 years.

Undamaged by overcharging, reverse charging or short circuits, the battery will require water only about once a year. The battery can be used in any position, works most efficiently in cold weather and can be 50 per cent charged from full discharge in about 15 minutes.

The nickel-cadmium battery is an alkaline system which uses a solution of potassium hydroxide as the electrolyte; sintered carbonyl nickel powder makes up the grids of both positive and negative plates. Nickel oxide is the active material of the positive plate when charged and cadmium that of the negative plate.

Built by Sonotone Corp. and distributed through Chrysler's Mopar Parts Div., the battery can be used in passenger cars but is expected to find its greatest use in industrial equipment and some commercial automobile purposes.

Car of the Week

Still an outstanding style job in its field, the Studebaker interiors of last year have been brought more nearly up to standard this year. That, coupled with grill and trim changes largely tell the Studebaker story in 1954.

The Studebaker is one of an exclusive group which did not increase horsepower this year, retains the acceptable performance registered last year. No slogger at a traffic light, the car does sag a bit comparatively in the 50-70 mph passing range on the open road. Interesting, indeed, would be an optional supercharger on the Commander to give it that extra boost from adequacy to exhileration.

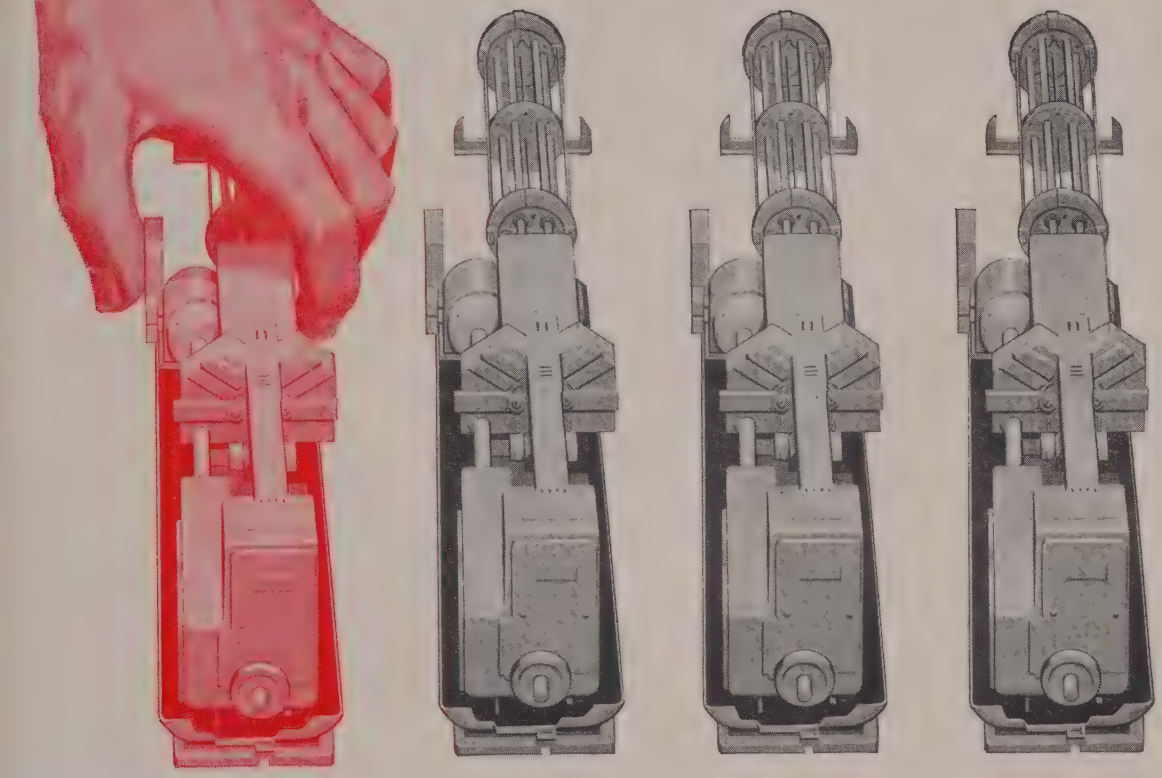
Interior room, spacious for the driver and front seat passenger, still remains a bit on the snug side for rear seat riders on a long trip though a newly removable center arm rest makes three in the rear more feasible than before. Ride is average and handling and cornering remain good.

Notable in the list of worthwhile ideas is the double brake pedal which Studebaker adopted some years ago on automatic transmission cars. Left foot braking is definitely moving to the recommended list of good driving practices, will probably make a pronounced appearance on many cars such as Cadillac next year via pedals similar to the Studebaker type.

All in all the Studebaker remains a beauty of the American scene, though you have to pay the price of a few compromises to live with it.

LEDLOY* Adds 35%

More Screw Machine Capacity!



● "We increased screw machine capacity over ⅓ (35% to be exact)", says one enthusiastic user of Ledloy. Other users report increases of 30% to as high as 75%. In every case, Ledloy produced better finish. With identical heat treatment, mechanical properties such as yield strength, tensile strength, and ductility were unaffected.

This faster feeding, faster machining steel can do the same for you. Call your local representative or write today regarding application of Ledloy to your products.

Similar advantages are also obtainable through use of leaded alloy steels which are available in full range of A.I.S.I. or S.A.E. standard analyses.

ARISTOLOY STEELS

*Inland Ledloy License

COPPERWELD STEEL COMPANY • STEEL DIVISION • WARREN, OHIO

For Export—Copperweld Steel International Company, 117 Liberty Street, New York, N. Y.

Steel that puts on a coat to take a bath

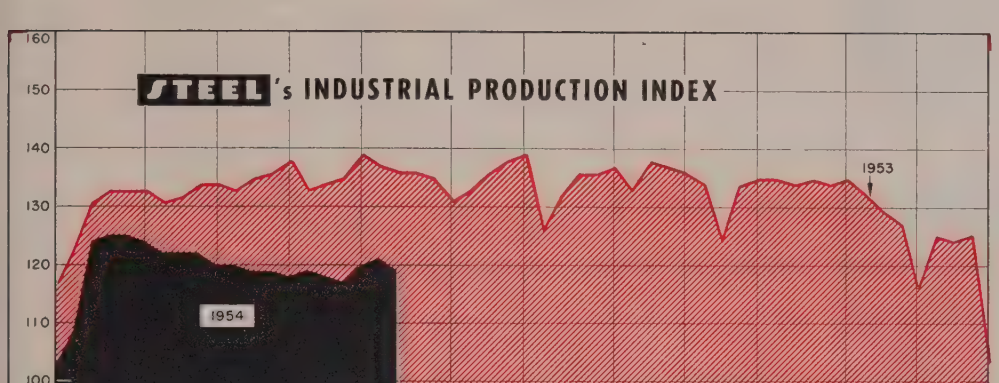
THE plunger in an oil well pump works thousands of feet underground where no one ever sees it. Yet it wears a costly coat of gleaming chrome-plate—vital protection against abrasive sand and grit and highly corrosive chemicals in the raw oil.

One manufacturer was having trouble getting the chrome to stay on. One out of every four plungers had to be rejected. The trouble was minute surface defects in the steel he was using.

Timken Company metallurgists were called in. They recommended a certain analysis of Timken seamless tubing that had the special qualities needed for this application.

The Timken steel proved to be the answer to this problem. It took the chrome-plating perfectly without a single rejection. Complete pumps rolled off the assembly line without costly production delays.

The files at the Timken Company contain records of hundreds of problems like this, solved by Timken alloy steel. Next time you have a tough steel problem, write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO". Tapered Roller Bearings, Alloy Steel and Seamless Tubing, Removable Rock Bits.



LATEST WEEK*	119
PREVIOUS WEEK	121
MONTH AGO	118
YEAR AGO	136

* Week ended May 8

Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 11%

Industrial Production Rise To Be Delayed?

"CAN'T SAY for sure, but it looks as if industrial production will continue to decline until September or October!" That's what the crystal ball tells most members of the Cleveland chapter, American Statistical Association.

Averaging their forecasts, the Federal Reserve's industrial production index, seasonally adjusted, is expected to slip to a low of 118 from an actual peak last year of 137 per cent of the 1947-1949 average. Opinion then divides as to the course of industrial production during the remainder of the year. Three-fourths of the group think that production will rise—to 125 in December. The others foresee a continuation of the slide—to 115 by year's end.

A minority believes that production will rise in the present quarter, slide during the third quarter and rise again in the final three months. Currently this view seems to have the best perspective.

STEEL's New Index Dips . . .

During the latest week, STEEL's new industrial production index slipped to a preliminary 119 per cent of the 1947-1949 average. Reductions in steel output and automobile outturn accounted for the decline. Production thereby slid to a level 6 points under the year's high and 20 points below last year's peak.

Because of its increasing usefulness as an economic indicator, electric output was given a weighting of 32 per cent in STEEL's new index. Formerly the weighting was 23 per cent. Offsetting this increase, the weighting given automobile production was reduced from 20 per cent to 11 per cent.

The Pacesetter . . .

Despite the current production level, the construction industry continued to set new records in

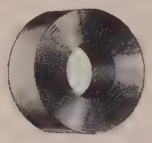
BAROMETERS OF BUSINESS

	LATEST PERIOD	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,604	1,637	2,259
Electric Power Distributed (million kwhr)	8,438	8,390	7,897
Bitum. Coal Output (daily av.—1000 tons)	1,113	1,123	1,462
Petroleum Production (daily av.—1000 bbls)	6,640[1]	6,622	6,335
Construction Volume (ENR—millions)	$494.0	$241.1	$360.1
Automobile, Truck Output (Ward's—units)	155,909	159,206	179,621
TRADE			
Freight Car Loadings (unit—1000 cars)	660[1]	648	765
Business Failures (Dun & Bradstreet, no.)	206	234	165
Currency in Circulation (millions)[3]	$29,756	$29,645	$29,863
Dept. Store Sales (changes from year ago)[3]	−1%	−2%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,570	$18,441	$18,386
Federal Gross Debt (billions)	$271.1	$270.1	$265.6
Bond Volume, NYSE (millions)	$18.4	$19.1	$14.0
Stocks Sales, NYSE (thousands of shares)	9,936	11,202	6,254
Loans and Investments (billions)[4]	$79.1	$78.9	$76.3
U. S. Gov't Obligations Held (billions)[4]	$32.2	$31.5	$29.2
PRICES			
STEEL's Finished Steel Price Index[5]	189.74	189.74	181.31
STEEL's Nonferrous Metal Price Index[6]	212.2	213.3	221.1
All Commodities[7]	111.0	111.1	109.8
Commodities Other Than Farm & Foods[7]	114.5	114.6	113.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1954, 2,384,549. 1953, 2,254,459. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

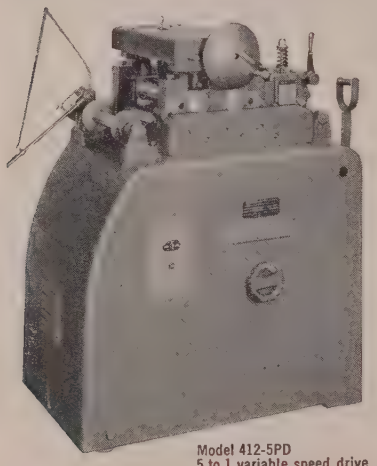
for AUTOMATION
on slitter, shear
or punch press

coil stock

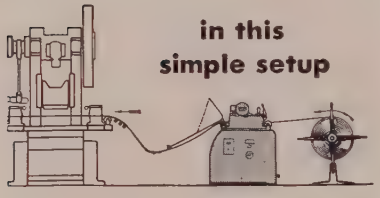


made easily workable
flat stock

by a LITTELL
Variable Speed
Straightener



Model 412-5PD
5 to 1 variable speed drive
Straightens steel stock up
to .125" thick x 12" wide.



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simple setup

Coil stock comes out of a Littell Straightener commercially *flat*, in perfect condition for accurate, automatic, high speed work on punch press, shear or slitter. The right straightener for your requirements is in the complete Littell line. *Write for the Littell Straightener Catalog*

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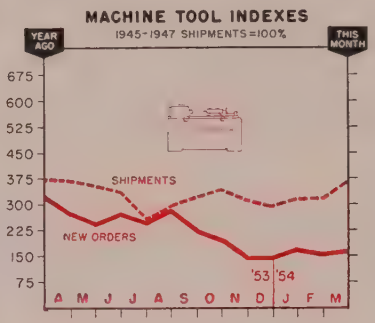
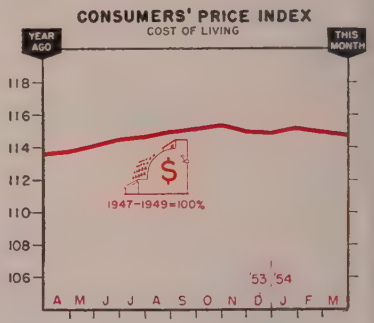




	New Orders		Shipments	
	1954	1953	1954	1953
Jan.	173.5	255.8	319.4	361.6
Feb.	159.8	282.1	323.1	354.5
Mar.	169.9	327.0	371.0	375.9
Apr.	....	276.8	....	372.7
May	....	246.4	....	356.0
June	....	273.4	....	342.2
July	....	247.3	....	267.6
Aug.	....	286.9	....	299.6
Sept.	....	223.7	....	328.3
Oct.	....	198.7	....	348.4
Nov.	....	146.6	....	320.2
Dec.	....	149.8	....	301.4

National Machine Tool Builders' Assn.

	(1947-1949=100)		
	1954	1953	1952
Jan.	115.2	113.9	113.1
Feb.	115.0	113.4	112.4
Mar.	114.8	113.6	112.4
Apr.	....	113.7	112.9
May	....	114.0	113.0
June	....	114.5	113.4
July	....	114.7	114.1
Aug.	....	115.0	114.3
Sept.	....	115.2	114.1
Oct.	....	115.4	114.2
Nov.	....	115.0	114.3
Dec.	....	114.9	114.1

U. S. Bureau of Labor Statistics.

Charts Copyright 1954 STEEL.

April. George C. Smith, F. W. Dodge Corp. economist, describes contract awards reported for April as not only the highest ever for the month but also as among the highest ever tallied for any month in Dodge's history.

Other Leaders . . .

Moreover, the National Bureau of Economic Research includes these awards among a series of eight indicators which consistently lead the business cycle. Five of these indicators are currently rising. They are: Commercial and industrial contract awards, F. W. Dodge; stock prices, Dow-Jones; new business incorporations, Dun & Bradstreet; basic prices, Bureau of Labor Statistics; and manufacturers' new orders, Department of Commerce. The three indicators pointing to a lower level are: Residential contract awards, F. W. Dodge; business failures, Dun & Bradstreet; and work week, Bureau of Labor Statistics.

Business Sales Rise . . .

Like most of the eight indicators, total business sales have improved. Sales in March totaled $47.7 billion, the Department of Commerce says. At this level sales were $4.6 billion greater than in February and only $2.3 billion less than the same month last year.

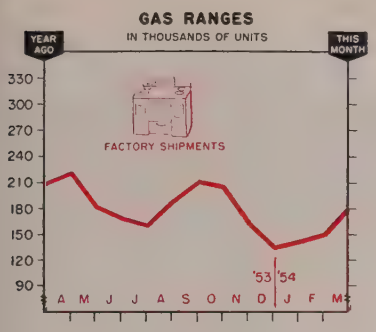
Inventories Rise Also . . .

Though sales improved, business inventories increased during March. Inventories rose to $81.1 billion, $744 million above the February level and $1.6 billion more than in March, 1953. With stocks at this level, the inventory-sales ratio was higher than a year ago.

Like manufacturers, wholesalers participated in the sales increase in March. Their sales rose 11 per cent over February to a level only 3 per cent below the same month last year. And their inventories, while increasing 1 per cent during the month, were a favorable 2 per cent below March, 1953.

Job Situation Improves . . .

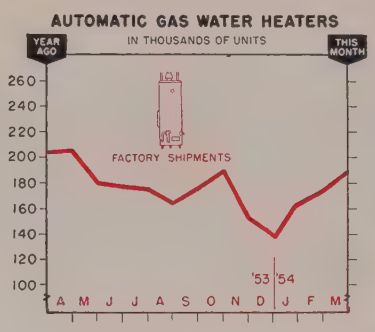
Following the sales gains during March, the employment-unemployment picture brightened. Between early March and early April total employment rose by half a million to 60.6 million, the Department of Labor relates. Nonfarm jobs, however, increased by only 125,000, and manufacturing employment



Shipments in Units

	1954	1953	1952
Jan.	137,000	169,200	166,100
Feb.	146,600	185,900	166,200
Mar.	177,800	208,200	185,200
Apr.	.....	220,300	182,300
May	.....	181,000	162,800
June	.....	166,600	175,700
July	.....	159,000	154,200
Aug.	.....	186,800	178,600
Sept.	.....	209,500	199,600
Oct.	.....	203,900	239,700
Nov.	.....	158,500	186,400
Dec.	.....	134,400	178,600
Total	.....	2,183,300	2,175,400

Gas Appliance Mfrs. Assn.



Shipments in Units

	1954	1953	1952
Jan.	164,400	184,000	148,700
Feb.	175,000	188,500	145,800
Mar.	188,900	203,000	153,300
Apr.	.....	204,400	153,300
May	.....	179,000	155,300
June	.....	175,800	159,000
July	.....	173,800	131,300
Aug.	.....	163,000	161,500
Sept.	.....	175,300	171,200
Oct.	.....	189,200	185,300
Nov.	.....	151,900	167,100
Dec.	.....	137,800	178,600
Total	.....	2,125,700	1,910,400

Gas Appliance Mfrs. Assn.

dropped again—this time by 250,000.

Total unemployment actually fell 260,000 in the month to Apr. 10. This decline, which was the first since unemployment started rising in the fall of 1953, still left 3,465,000 persons unemployed. Though improved, the rate of unemployment remains considerably larger than most post World War II Aprils and about equal to the April figures for 1949 and 1950.

Long-term Sorrow . . .

Unfortunately the general improvement in unemployment has had little effect on the number out of work for 15 weeks or longer. The long-term jobless total 1 million and represent almost one-third of all unemployed. Already in Ohio, 9 per cent of the long-term jobless—26 weeks or longer—have exhausted their unemployment compensation benefit rights. This figure doesn't look half bad, however, compared with the first quarter of 1950. Then 37 per cent of those eligible had exhausted their benefits.

Current Suggestions . . .

Based on the assumption that the economy is now at a critical point, Dr. Charles F. Roos, president, Econometric Institute Inc., suggests "that a relatively small push by the nation's monetary authorities will start business moving upward." He believes that business will improve if the Federal Reserve Board takes any one of the following steps: 1. Adds $500-million to the total Reserve Bank credit by open-market purchases of notes, bills or bonds; 2. Lowers the rediscount rate slightly below the short-term rate; and 3. Lowers the required reserves of banks by a small amount.

Latest Financial Activity . . .

While his suggestions are being considered, interest rates continue downward. In the latest development major finance companies such as General Motors Acceptance Corp. and C. I. T. Financial Corp. reduced the interest rates they pay short-term investors for the sixth time this year. Concurrently loans to manufacturers of petroleum, coal, chemicals, and rubber products increased more in the latest week than at any time since December, according to the reporting member banks of the Federal Reserve System.

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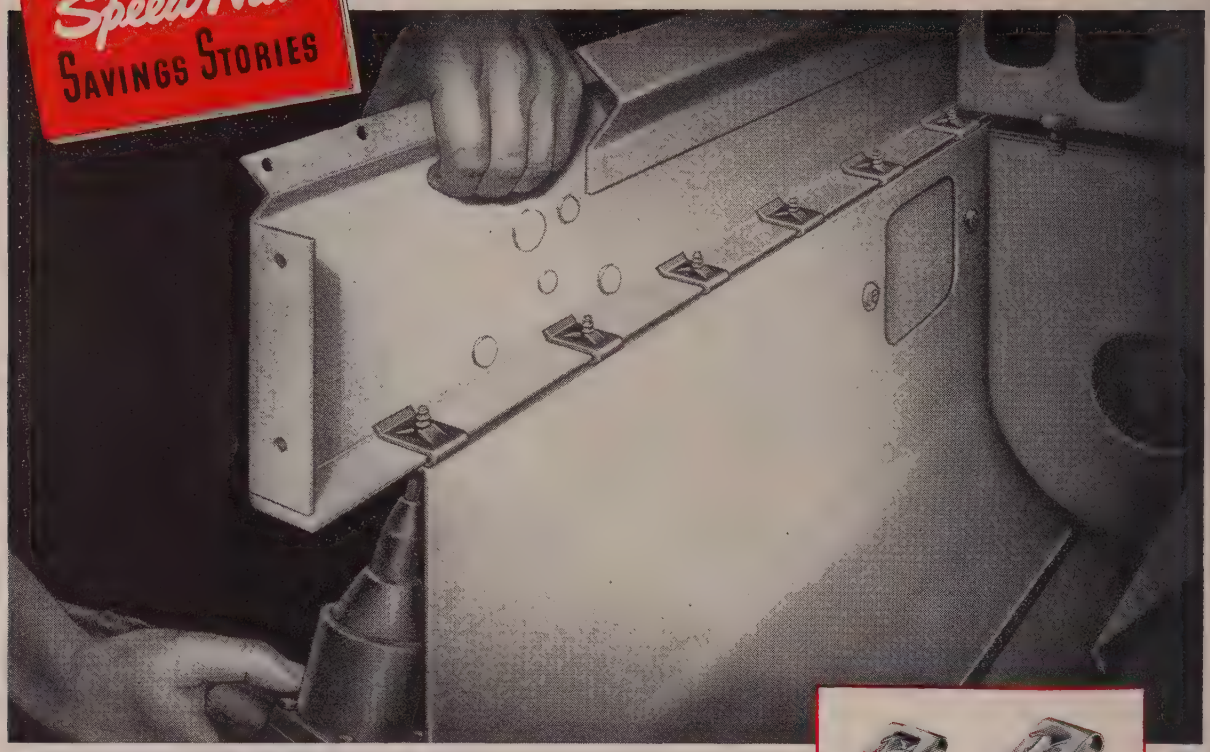

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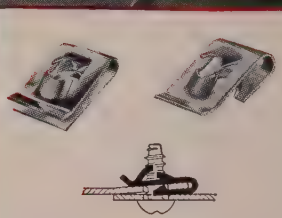
This triple play resulted from John Deere's six years of field testing and research into fastening methods. Studies proved that rugged, self-retaining SPEED NUTS provide the simplest, fastest, most secure attachments, and make servicing far simpler.

Similar savings and advantages can be yours. See your Tinnerman representative for details on our free Fastening Analysis Service.



Self-retaining "U" and "J" Type SPEED NUTS hold themselves in screw-receiving positions for blind-location assembly. John Deere uses sturdy 14Z sheet metal screws, power-drives them into nuts—no pre-assembling! SPEED NUTS can't freeze on threads—screws are always easy to remove for servicing.

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ROBERT G. ALLEN
. . . heads Pesco Products

JOSEPH HALPERIN
. . . Aeroil Products v. p.

W. W. HOPWOOD
. . . heads Hagan Corp. and subsidiaries

New president and general manager of Borg-Warner Corp.'s **Pesco Products Division,** Bedford, O., is **Robert G. Allen** who previously was vice president of Great Lakes Carbon Corp. **Robert J. Minshall,** former Pesco president, was named chairman of the supervisory board and director of research and development for the division.

Peerless Electric Co., Warren, O., appointed **Shannon C. Powers** general manager, **William K. Terry** manufacturing manager, **D. G. Kroehle** assistant manufacturing manager, **Cecil G. Young** chief engineer and **James A. Kutz** sales manager, motor division. **J. L. Hadley,** former vice president-engineering, becomes vice president-technical counsel.

C. A. Pickett was elected vice president, **Illinois Engineering Co.,** Chicago. He has served as general manager since the company was acquired by American Air Filter Co. Inc., Louisville, in 1953.

Edward Keating was elected executive vice president, **Ekco Products Co.,** Chicago.

Athey Products Corp., Chicago, elected **W. D. Lease** vice president-sales, **R. W. Kling** vice president-engineering, **C. E. Matthews,** vice president-service and parts and **R. S. Hinds** treasurer and assistant secretary.

Joseph Halperin was elected vice president, **Aeroil Products Co. Inc.,** South Hackensack, N. J. He was made general manager January, 1953.

At the research and development center of **Babcock & Wilcox Co.,** Alliance, O., **P. R. Grossman** was made chief research engineer, **A. F. Boehm** manager of facilities, **G. A. Watts** products section superintendent and **W. O. Stone Jr.** purchasing agent.

C. William Conn was made steel division production manager, **Ford Motor Co.,** Dearborn, Mich. He previously was manager of the division's open-hearth and electric furnaces.

W. Harvey Thompson was named assistant to the executive vice president of **H. K. Porter Co. Inc.,** Pittsburgh. He succeeds **R. F. Allen,** now a vice president in charge of the Buffalo Steel Division. Mr. Thompson was vice president, Standard Instrument Corp.

H. C. Birkhead joined **Cleveland-Cliffs Iron Co.** to serve as head of the New York district sales office.

E. A. Brophy, for 28 years in both metallurgical and sales capacities with **Braeburn Alloy Steel Corp.** and recently Detroit district sales manager, has been elected vice president.

W. W. Hopwood succeeds **David J. Erikson** as president of **Hagan Corp.,** Pittsburgh, and subsidiary companies. Mr. Erikson, retiring due to ill health, will serve the corporation as a consultant. Mr. Hopwood has been vice president and a director since 1949.

Herbert B. Fox was made director of purchases and **Charles F. Kalmbach** purchasing agent for **E. F. Houghton & Co.,** Philadelphia.

J. H. Hatch III, former production manager, Rock Island Bridge & Iron Works, Rock Island, Ill., moved to Shawnee, Okla., where he is now president of **Shawnee Steel Co.,** a new organization specializing as a fabricator in structural steels.

Earl M. Doig, Hanna Furnace Corp. vice president and also vice president of **Great Lakes Steel Corp.,** was elected president of Hanna Furnace Corp., merchant pig iron producer in Buffalo. Both companies are subsidiaries of National Steel Corp. **Elmer Schwartz,** general manager of operations at Great Lakes, was elected vice president in charge of operations of that company.

James A. Munro, manager of the work order department, Detroit plant, **Joseph T. Ryerson & Son Inc.,** was appointed assistant manager of the structural fabricating division at the Chicago plant. He

J. A. WATSON
. . . Motor Wheel exec. v. p.-automotive

L. R. LARSON
. . . Inco v. p. and gen. sales mgr.

is replaced at Detroit by **Robert H. Hering.**

Motor Wheel Corp., Lansing, Mich., elected **J. A. Watson** and **R. A. Cole** to the newly created positions of executive vice president-automotive and executive vice president-appliances, respectively. For the last seven years Mr. Watson has been vice president in charge of automotive manufacturing and has served as a director since 1952. Mr. Cole has been vice president in charge of manufacturing of the firm's Du-Therm Division. He, with **Arthur H. Wrock** of Detroit, was added to the board of directors.

Pittsburgh Steel Co., Pittsburgh, promoted **Cramer Gilmore** to superintendent of seamless hot mills at its Allenport, Pa., Works.

Charles A. Reif is now president of **Reif-Rexoil Inc.,** Buffalo, heating equipment manufacturer. He was a vice president and succeeds his brother, **Col. Allan F. Reif,** and has purchased the latter's interest in the firm.

Nelson C. George, assistant chief metallurgist at the Gary, Ind., sheet and tin mill of **United States Steel Corp.,** was promoted to chief metallurgist. He succeeds **John A. Eckel,** promoted to assistant to the general superintendent at the Fairless Works, Morrisville, Pa.

Milton L. Spence was made district sales manager, materials handling division, **Mill Supply Corp.,** with headquarters in Syracuse, N. Y.

L. R. Larson, since 1952 assistant vice president and assistant general sales manager, was elected vice president and general sales manager of **International Nickel Co. Inc.,** New York. At the parent firm, **International Nickel Co. of Canada Ltd.,** Copper Cliff, Ont., **Ralph D. Parker,** in addition to his post of assistant vice president, succeeds **J. Roy Gordon** as general manager of Canadian operations. Mr. Gordon, vice president and a director of the company, transfers from Copper Cliff to make his headquarters in New York. Also at Copper Cliff, **Walter C. Kerrigan** was made assistant to the president and **Herbert G. Fales** assistant to the chairman. Mr. Kerrigan also was elected to the same position with the U. S. subsidiary where he has been general sales manager and a vice president. **Richard A. Cabell,** assistant secretary, and **Paul Queneau,** metallurgical engineer at New York, also assistant vice presidents, were elected to the additional positions of assistant to the vice president of the parent firm.

Essak Steel & Chemical Co., Chicago, promoted **Harry Sirovy** to sales manager and appointed **Harold LaCasse** service manager, chemical division.

Russell Hoehl was made Philadelphia manager for **Russell, Burdsall & Ward Bolt & Nut Co.**

Brunner Corp. of Canada, Toronto, elected **A. Harold Fraser** chairman of the board, **Ralph Long** general manager, **Fred Murray** works manager and **Miss G. M. Parke** office manager.

H. F. Devens was made assistant to the general manager, metals division, **Olin Industries Inc.,** East Alton, Ill. **E. W. Sherman** was named assistant sales manager.

S. M. Swain was made vice president in charge of research, **North American Refractories Co.,** Cleveland.

John H. Crankshaw was made vice president, **J. A. Zurn Mfg. Co.,** Erie, Pa., and its affiliates including American Flexible Coupling Co.

Ronald N. Campbell, director of manufacturing at **Affiliated Gas Equipment Inc.,** Cleveland, was elected a vice president. He continues responsibilties for all manufacturing of the corporation and its subsidiaries.

Carl J. Oxford, chief engineer, was elected to the board of **National Twist Drill & Tool Co.,** Rochester, Mich.

Ralph I. Bost was made chief engineer, Autostarting Division, **Gould-National Batteries Inc.,** St. Paul. He will have headquarters at the firm's laboratory at Depew, N. Y. He replaces **N. J. Thompson** who is assuming other duties.

Feedall Machine & Engineering Co., Willoughby, O., appointed **John Pecek** sales manager.

Warren H. Atkinson was made scaffolding division sales manager of Sharon Steel Corp.'s **Brainard Steel Division,** Warren, O.

Alabama By-Products Corp., Birmingham, elected **F. G. Koenig Jr.** executive vice president, **J. Elbert Johnson** vice president-treasurer, **Roy H. Norris Jr.** vice president-sales, **Homer Cardner** vice president-by-product operations, **Henry J. Hager** vice president-mining operations.

Harold L. Heuser was placed in charge of sale of standardized conveyors in the Cleveland area for **Mathews Conveyer Co.** His territory includes Akron, Canton, Massillon, Mansfield, Lorain and Sandusky as well as Cleveland.

John S. Collbran Jr. was named western district sales manager,

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ALL CHERRYING CUTS

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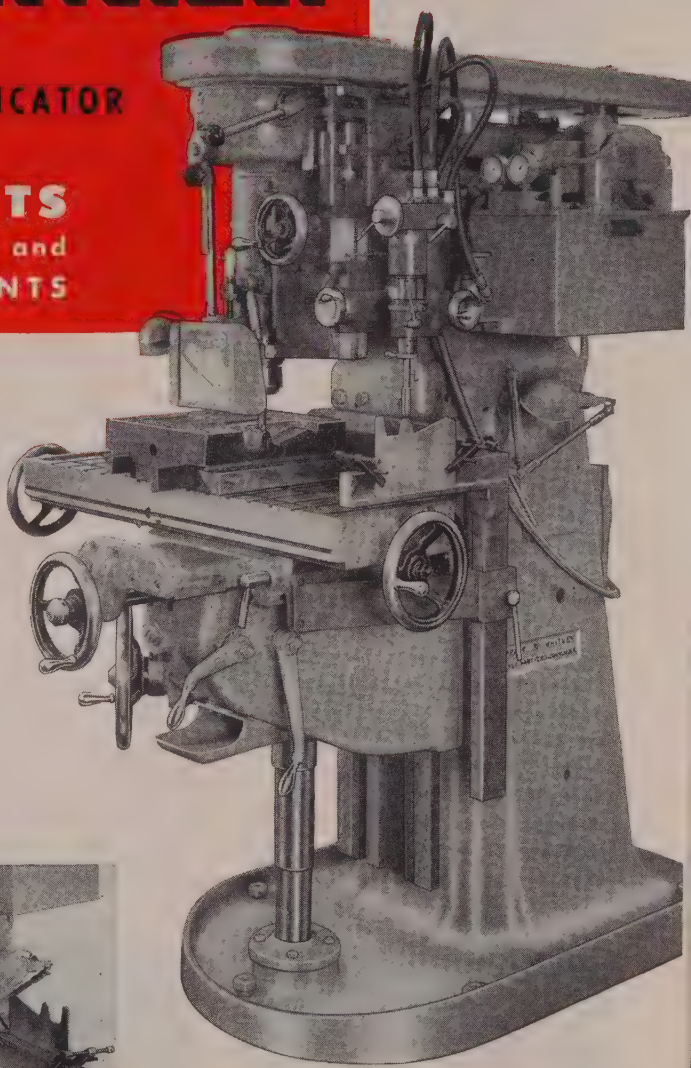

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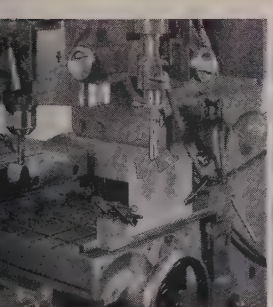

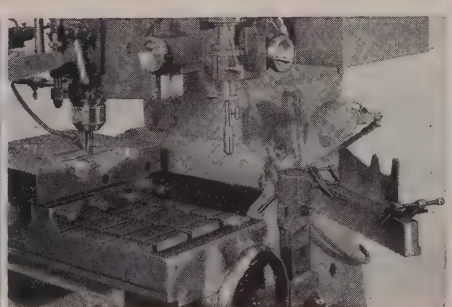

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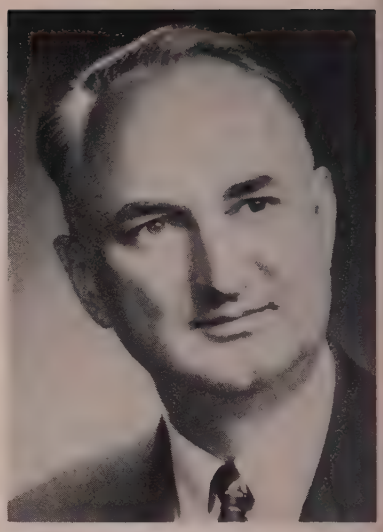
JOHN J. LEE
. . . Twin Coach exec. v. p.



JAMES G. WRAY
. . . Continental Can Syracuse mgr.

Chicago, for **New Jersey Zinc Sales Co.** to succeed **David P. Brannin,** retired.

David A. Griffith was made general manager of **Allis-Chalmers Mfg. Co.'s** Pittsburgh Works. He succeeds **J. W. McMullen,** now vice president in charge of the company's transformer and switchgear equipment.

Carroll Cone was appointed chief engineer, industrial divisions, **Surface Combustion Corp.,** Toledo, O. Formerly chief engineer, steel mill division, he is replaced by **William H. Dailey** who was staff engineer of that division.

John J. Lee was elected executive vice president, **Twin Coach Co.,** Kent, O. He has served as a vice president and general manager of Twin Coach Aircraft Division, Buffalo, since 1947. He previously was general manager of the Buffalo plants of Curtiss-Wright Airplane Division.

Donald C. Burnham joined **Westinghouse Electric Corp.,** Pittsburgh, as vice president in charge of manufacturing. Formerly manufacturing manager and assistant chief engineer of GM's Oldsmobile Division, he succeeds **T. I. Phillips,** retired. He will have headquarters at Pittsburgh.

James G. Wray was made manager of **Continental Can Co.'s** Syracuse, N. Y., machine plant. He formerly was manager of the Philadelphia equipment division plant of Crown Cork & Seal Co.

Elmer J. Heastan was named superintendent and **Frank C. Lauer** assistant superintendent of the by-product coke department at the Hazelwood plant of **Jones & Laughlin Steel Corp.,** Pittsburgh. **Walter L. Moore** was made assistant chief accountant-mill accounting for the Pittsburgh Works Division.

Michael J. Hughes Jr. of Seattle was appointed assistant metallurgical engineer, **Bethlehem Pacific Coast Steel Corp.**

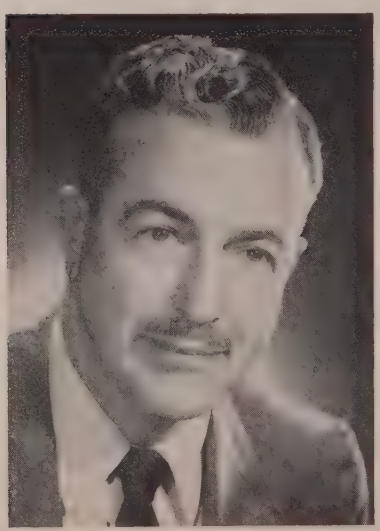
John R. Porn was named sales manager for **Continental Can Co.'s** Omaha metal can sales district.

Arthur W. Grabb was appointed manager of industrial engineering, **Ritter Co. Inc.,** Rochester, N. Y.

D. D. Robertson, former general sales manager, was promoted to director of sales for **Dana Corp.,** Toledo, O. **Charles C. Dybvig** was made general sales manager.

Heyl & Patterson Inc., Pittsburgh, named **J. A. Farnsworth** contracting engineer and appointed **J. P. Blair** assistant chief engineer, light equipment engineering division.

Clemmens A. Tarter was named assistant superintendent of cold

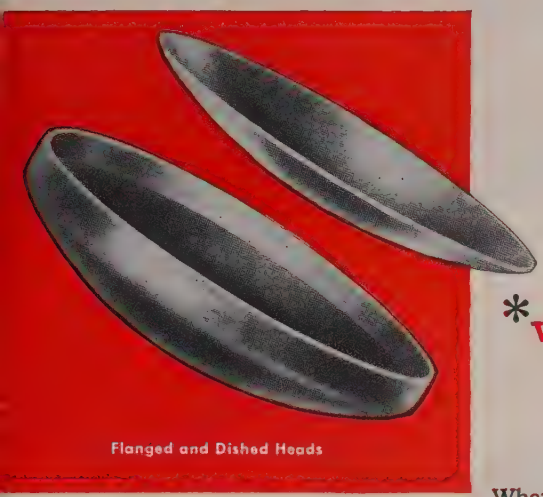


CARROLL CONE

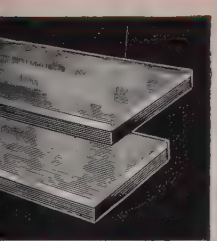
WILLIAM H. DAILEY

. . . chief engineers of Surface Combustion Corp.

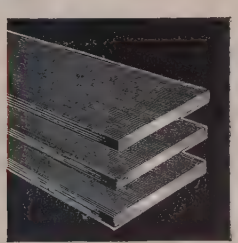
*heads---you win



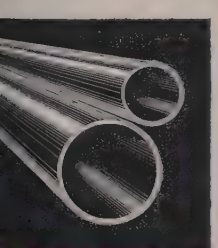
Flanged and Dished Heads



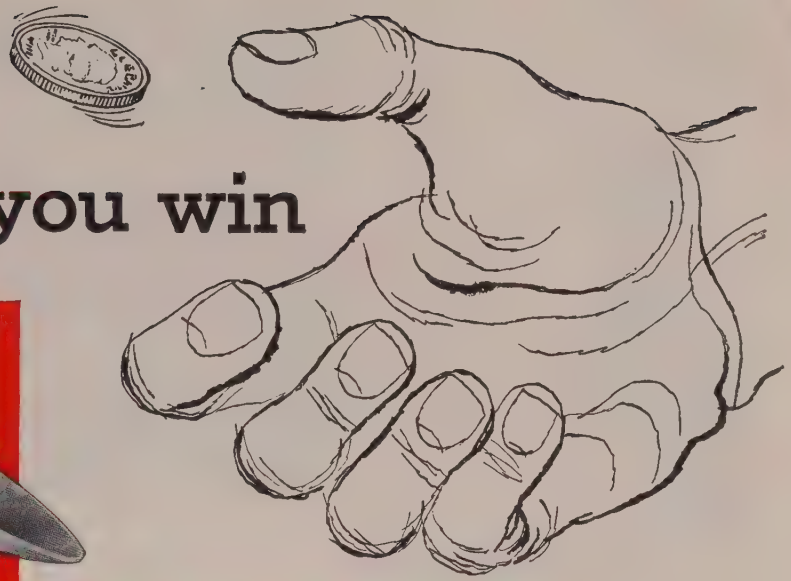
Stainless-Clad Steel Plates



Alloy and Carbon Steel Plates



Large Diameter Welded Steel Pipe



*when they're made by CLAYMONT

Whatever your needs in flanged and dished heads, you're a winner every time when you call for heads by Claymont.

We can always meet your most exacting specifications because with us the spinning of flanged and dished heads is more than just a job—it's an art into which we put the most painstaking care and specialized know-how.

Our flanging department can supply you with flanged and dished heads in diameters from 9 inches to 19 feet and in gauges from 3/16-inch to 6 inches. Made in carbon steel, alloy steel or with stainless steel cladding. We are also prepared to handle head forming operations on both ferrous and non-ferrous metal circles supplied by the customer.

Other Claymont products include Stainless-Clad Steel Plates, Alloy and Carbon Steel Plates, Large Diameter Welded Steel Pipe.

Write or call Claymont Steel Products Department, Wickwire Spencer Steel Division, Claymont, Delaware.

ABILENE • ALBUQUERQUE • AMARILLO • ATLANTA • BOISE • BOSTON • BUFFALO
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PRODUCTS OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

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Particularly when it comes to seamless steel tubing. For our modern, versatile plant is completely equipped to produce almost any type of cold drawn seamless tubing you may require—and produce it to *your* specifications. What's more, every Summerill tube is drawn to a smooth, bright surface, unusually free from pits, die scratches and scale—thanks to our step-to-step quality control and close inspection.

Our research, production and sales service groups will welcome the opportunity to show you how you can make a better product at less cost with Summerill Seamless Steel Tubing. And it may surprise you to discover how quickly our closely knit organization can move from problem to production. ● Write today for free booklet listing typical sizes, shapes and specifications of Summerill Tubing. Address: *Summerill Tubing Division, Columbia Steel & Shafting Company, Pittsburgh 30, Pa.*

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THOMAS F. FLOOD
. . . Frank G. Hough v. p.-mfg.

C. A. BRASHARES
. . . Harbison-Walker gen. sales mgr.

reduction in the tin plate mill, **Kaiser Steel Corp.**, Fontana, Calif., Works.

Thomas F. Flood is now vice president in charge of manufacturing for **Frank G. Hough Co.**, Libertyville, Ill. **Milton J. Weber**, vice president in charge of procurement, was elected a director. For the last two years Mr. Flood has been production manager.

Alfred H. Pope was made product supervisor for metal cleaners, **Pennsylvania Salt Mfg. Co.**, Philadelphia.

Peter L. Pantarotto was named general sales staff manager for U. S. Steel Corp.'s **Gerrard Steel Strapping Division**, Chicago. He succeeds **L. A. Kuckie**, resigned.

Firestone Steel Products Co. appointed **R. J. Loeven** superintendent of the Akron steel products plant, **J. B. Call** production manager and **D. E. Oldham** chief production engineer.

Harbison-Walker Refractories Co., Pittsburgh, appointed **C. A. Brashares** general sales manager. He was made Birmingham district sales manager in 1948 and in 1953 was appointed assistant general sales manager.

Effective June 1, **W. A. Brown** will be chairman of the board of **Kerchner, Marshall & Co.**, Pittsburgh. **W. W. Hazzard Jr.** will be president and **Miss M. M. Gramm** treasurer.

B. A. Barker was named assistant purchasing agent in charge of general purchases, and **L. C. Held** assistant purchasing agent in charge of subcontracting at **Chance Vought Aircraft Inc.**, Dallas.

J. F. Schirtzinger was elected president and general manager of **Consolidated Tool & Products Co.**, Los Angeles.

A. E. Carter was made assistant general manufacturing manager, tractor and implement division, **Ford Motor Co.**, at Birmingham, Mich. He is succeeded by **Lyle W. Blanchard** as manager, manufacturing engineering department. **W. R. Phillips** becomes quality control department manager. He is replaced as manager, quality control department, at the Highland Park tractor plant by **T. R. Kermou.**

Thomas B. Preston, sales engineer with the mechanical goods division of **United States Rubber Co.**, was transferred to Los Angeles to take charge of grinding wheel sales for the Pacific Coast.

Chrysler Corp. of Canada, Windsor, Ont., appointed **R. L. Downey** general purchasing agent and **J. G. McKenzie** supervisor of buyers.

Lester J. Herrick was appointed to the newly created position of general manufacturing manager, **New Process Gear Corp.**, Syracuse, N. Y.

John Hilldring was elected executive vice president, **General Aniline & Film Corp.**, New York.

George W. Vryland resigned as staff engineer of Massena Works, Aluminum Co. of America, to become project engineer of **Essex Wire Corp.**, Detroit.

George F. Begoon was made director, southeastern sales district, Thermobloc Division, **Prat-Daniel Corp.** He has headquarters in Ft. Lauderdale, Fla.

Danly Machine Specialties Inc. appointed **John L. Ongemach** manager of its Cleveland branch office, **B. A. Hall** manager of its Dayton, O., office and **Niel Griest** sales engineer at Dayton.

International Business Machines Corp., New York, appointed **Dean R. McKay** assistant sales manager of electric accounting machines.

OBITUARIES...

R. W. Sternke, 56, vice president and production manager, **Lakeside Bridge & Steel Co.**, Milwaukee, died May 6.

F. W. Wilkening, founder and chairman of the board of **Wilkening Mfg. Co.**, Philadelphia, died Apr. 22.

Alfred Koehler Sr., 70, one of the founders of **Seymour Brass Turning Co.**, Seymour, Conn., died Apr. 29. He held a top executive position until retirement last January.

Harry L. Bill, vice president-general manager, **Greenfield Tap & Die Corp.**, Greenfield, Mass., died Apr. 15.

Francis R. Kimmond, 57, vice president-general manager, **Filtros Inc.**, Rochester, N. Y., died Apr. 28.

Harry M. Frecker, 50, manager of commodity sales for the mechanical goods division of **United States Rubber Co.**, New York, died May 3.

Clarence H. Fryer, 56, general manager, **Erie Concrete & Steel Supply Co.**, Erie, Pa., died Apr. 28.

Edgar F. Schaefer, 58, president, **Gardner-Denver Co.**, manufacturer of mining equipment, Quincy, Ill., died May 2.

The LANSING

LANSING, MICHIGAN
DROP FORGING CAPITAL OF THE WORLD

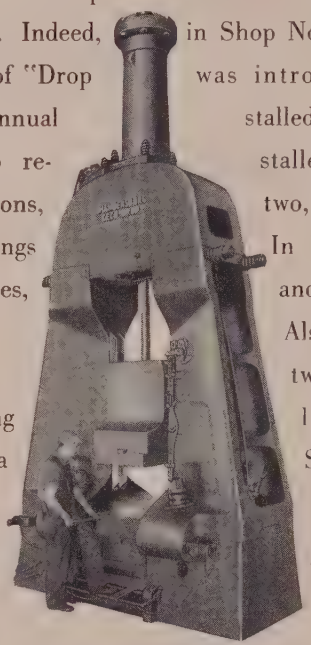
LANSING, capital city of Michigan, is famous for many things, particularly in the automotive field, but it is unique among the industrial cities of the United States in the concentration of drop forging activity in its many factories. Indeed, Lansing may well lay claim to the title of "Drop Forging Capital of the World", for its annual production of forgings, according to recently published figures, was 208,000 tons, or more than 11% of all the forgings produced annually in the United States, which was 1,885,662 tons.

•

Located in Lansing are six great forging plants, covering 14 acres of land, with a working area of over 985,579 square feet and representing an investment in excess of $26,000,000. Annual payrolls of these companies total in excess of $15,520,000.

•

All these great forging companies are using Chambersburg Ceco-Drops. The first was installed in Shop No. 1 in 1947, the year the Ceco-Drop was introduced. In 1948, Shop No. 4 installed two Ceco-Drops and Shop No. 3 installed one. In 1950 Shop No. 2 installed two, and Shop No. 4 repeated with one. In 1951 Shop No. 2 repeated with two and Shop No. 4 again repeated with two. Also in 1951 Shop No. 3 repeated with two and Shop No. 6 installed eight. In 1952 this shop repeated with three and Shop No. 3 repeated with one. That same year Shop No. 5 installed three. In 1953 Shop No. 2 repeated with one and Shop No. 4 with two more.



Write for details

CHAMBERSBURG ENGINEERING COMPANY

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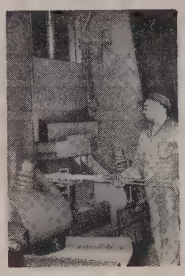
STORY..

FORGE SHOP No. 1

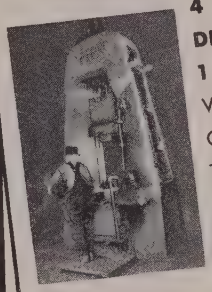
THE FIRST CECO-DROP IN LANSING WAS INSTALLED HERE. THIS COMPANY SPECIALIZES IN AUTOMOTIVE FORGINGS. CECO-DROP IS FORGING AUTOMOBILE CONNECTING RODS—A TOUGH JOB.

FORGE SHOP No. 2



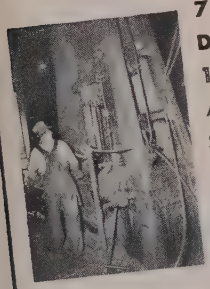
5 CECO-DROPS SINCE 1950. THIS COMPANY ALSO WORKS LARGELY ON AUTOMOTIVE FORGINGS. CLAIM GREATER PRODUCTION THAN ON BOARD DROPS. THEIR HAMMERMEN PREFER CECO-DROPS.

FORGE SHOP No. 3



4 CECO-DROPS SINCE 1948. THEY WORK LARGELY ON AUTOMOTIVE AND COMMERCIAL FORGINGS. CECO-DROPS HAVE DONE A GOOD JOB, ACCORDING TO MANAGEMENT.

FORGE SHOP No. 4



7 CECO-DROPS SINCE 1948. FORGE AUTOMOTIVE STEERING GEARS, UNIVERSAL JOINTS, ETC. HIGHLY SATISFIED WITH PERFORMANCE OF THEIR SEVEN CECO-DROPS.

FORGE SHOP No. 5

3 CECO-DROPS SINCE 1952. THIS COMPANY IS WORKING ON SMALLER TYPE OF FORGINGS, LARGELY AUTOMOTIVE. CECO-DROPS ARE A PART OF THEIR EXPANSION PROGRAM.

FORGE SHOP No. 6

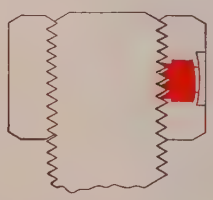
11 CECO-DROPS SINCE 1951. ONE OF THE LARGEST FORGE SHOPS IN THE WORLD. THE CECO-DROPS ARE WORKING ON AERONAUTICAL AND AUTOMOTIVE FORGINGS.

CHAMBERSBURG PENNSYLVANIA

DROP

You get positive locking in any position with

Republic "NYLOK"* Nuts



Here's how the "Nylok" principle works
A nylon plug inserted in one of the sides of the cold-forged nut forces the nut tightly against the opposite threads as the nut is turned on.

*U. S. Pat. No. 2,462,603 and No. 2,450,694 and pending applications.

Locking is positive even when the "Nylok" Nut is seated against a tubular section. And there's no need to pull Republic "Nylok" Nuts up tight. They lock wherever you stop wrenching—eliminating the need for lock washers.

These lock nuts are simple to apply. Either end is up. No special tools, lubricants or techniques are needed. Republic "Nylok" Nuts can be re-used.

Does this give you an idea for your product? Write us for samples, indicating sizes required.

12 WAYS BETTER

Assemble from either end • Can be re-used • Non-galling • Best wrenching characteristics • One-piece • Cold-forged • Won't damage threads No special tools • Lock in any position • No special know-how • No lubricants needed • Ideal for mechanical feeding

SIZES

Finished Series tapped ¼" through 1"
Finished Thick Series tapped ¼" through ½"
Heavy Series tapped ¼" through 1"

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GENERAL OFFICES • CLEVELAND 1, OHIO
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REPUBLIC STEEL
REPUBLIC BOLTS AND NUTS

Egleston Marks 125th Year

Since 1829, this warehouse has shipped about 3 million tons of iron and steel

IN LATE 1861, when Captain Ericsson was building the *Monitor* at Brooklyn Navy Yard, he often sent for iron plates and bars across New York's East river, buying from a warehouse which had been established in 1829 and which is still in business. This firm, Egleston Bros. & Co. Inc., Long Island City, N. Y., is observing its 125th anniversary and is approaching the 3-million-ton mark in shipments.

Egleston predates the modern steel industry by many years. Organized as Egleston & Battell, the firm sold iron, the best of which was imported from England. Large shipments, including strap iron for wooden rails, came over in clipper ships. Thousands of tons were delivered to customers in three-horse drays. Subsequently, the company was one of the first to use gasoline-driven trucks.

From Iron to Steel—History of Egleston is one from iron to mod-

FLEET OF TRUCKS
. . . speeds steel deliveries

ern steel. The company promptly moved into steel distribution when Carnegie and other Pittsburgh pioneers made domestic steel available.

Egleston supplied builders with large tonnages of steel for historic landmarks, including the Brooklyn bridge, Flatiron building and the early sections of New York subways and elevated railways.

Members of the Bragg family have been associated with the company since 1871 and in control since 1899. Sons of the first Bragg partner, Albert H. Bragg, are with the company now: Albert J. Bragg is president; James F. Bragg, treasurer.

THREE-HORSE DRAY
. . . carried iron products

The present Egleston warehouse has 100,000 sq ft of floor space with storage capacity for 10,000 tons; fabricating equipment for cutting, shearing, flame cutting, high-speed power sawing; and efficient threading and materials handling equipment.

Egleston Bros. & Co. deals almost entirely in carbon steel (sheets, strip, plates, bars and structurals). The firm also handles tool steel and wrought iron sheets and plates. It has never been active in specialties.

Raymond Mfg. Expanding

Raymond Mfg. Co., Corry, Pa., launched its second major expansion program since the end of World War II with the awarding of construction contracts totaling $500,000. An additional $100,000 will go toward making major departmental changes and for purchases of equipment. The firm is a division of Associated Spring Corp., Bristol, Conn.

GE To Build in Virginia

General Electric Co., Schenectady, N. Y., will build a multimillion dollar plant in Roanoke county, Virginia, for production of large industrial control equipment. Transfer of the department from Schenectady to the new site will release facilities for scheduled expansion of other departments in line with GE's future plans for the Schenectady Works. The proposed plant will have a total manufacturing area of about 450,000 sq ft and is scheduled to be in full operation by late 1957.

Alcoa Enlarges Foundry

Aluminum Co. of America, Pittsburgh, completed a $300,000 addition to its magnesium foundry in Buffalo.

Buys Thermo Fire Brick Co.

A. P. Green Fire Brick Co., of Texas, Houston, a subsidiary of A. P. Green Fire Brick Co., Mexico, Mo., acquired the Thermo Fire Brick Co., Sulphur Springs, Tex. Thermo manufactures a complete line of fire-clay refractories, specializing in high-duty and intermediate-duty firebrick.

Trio Metal To Expand Plant

Trio Metal Products Co., Baltimore, sheet metal fabricator, plans to build a plant containing about 5000 sq ft.

Bristol Firm Enters New Field

Kaiser Metal Products Inc., Bristol, Pa., entered the field of "glass lining" water heater tanks for heater manufacturers. The firm makes a wide range of porcelain enameled steel sinks and bathtubs and other sanitary ware, and synthetic enameled sinks, base and wall cabinets. The company completed tests on the processing of colored vitreous enameling on aluminum. Applications for its use as siding, architectural tile and appliance parts are now under consideration.

Plans Machine Tool Show

R. O. Deaderick Co. Inc., Knoxville, Tenn., and Atlanta, is sponsoring a machine tool show to be held at the Exhibition Hall of the Atlanta Biltmore Hotel, May 19-21. About 40 examples of the latest metalworking equipment will be in operation at the show. Companies represented will include

BUILT-IN to your production stock
when it's

WYCKOFF

COLD FINISHED STEEL

CARBON . . . ALLOY . . . LEADED

You can always be sure with

- Wyckoff Controlled Quality Carbon, Alloy and Leaded Steels
- Turned and Polished, Ground and Polished Shafting
- Strain and Stress Relieved, Annealed, Heat-Treated, Quenched and Tempered Steels
- Wide Flats up to 12" x 2"

FULL COLOR
SPARK TESTING FILM
AVAILABLE

This fast, inexpensive, non-destructive testing method identifies metals by analyzing the elements present. The film presents some of the fundamentals.

Address requests for showings to our general offices.

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American Tool Works Co., Avey Drilling Machine Co., Nebel Machine Tool Co., all of Cincinnati; Bridgeport Machines Inc., Bridgeport, Conn.; De Vlieg Machine Co. and Turchan Follower Machine Co., Detroit; Cone Automatic Machine Co., Windsor, Vt.; Covel Mfg. Co., Benton Harbor, Mich.; Gisholt Machine Co., Madison, Wis.; Niagara Machine & Tool Works, Buffalo; Grob Bros. Inc., Grafton, Wis.; Sheldon Machine Co. Inc., Chicago; and Van Norman Co., Springfield, Mass.

Plume & Atwood To Expand

Plume & Atwood Mfg. Co., Waterbury, Conn., manufacturer of metal specialties, brass and bronze, will increase facilities at Thomaston, Conn. A plant, containing 150,000 sq ft and costing about $1,250,000, will be erected. Adjoining the company's brass mill, the additional space will be occupied by its Fabricating Division.

Enters Prefabricating Field

Brookville Mfg. Co., Brookville, Pa., is manufacturing all-steel fully insulated structures of a design similar to the prefabricated steel buildings formerly produced by Blaw-Knox Co., Pittsburgh.

Ladish Buys Tri-Clover Machine

Ladish Co., Cudahy, Wis., manufacturer of seamless welding pipe fittings, forged steel fittings, flanges and drop forgings, acquired Tri-Clover Machine Co., Kenosha, Wis. Tri-Clover makes high-alloy and stainless steel pipe fittings, valves, pumps, and specialties. Ferdinand Hinrichs, formerly president of Tri-Clover, was elected vice president of Ladish in charge of the Tri-Clover Machine Division.

Dresser To Build in Tulsa

Dresser Industries Inc., Dallas, embarked on a long-range expansion program involving an ultimate capital expenditure of more than $1 million. The immediate program calls for construction of an office building and warehouse building in Tulsa, Okla. Clark

Shear Connectors

Welders in the plant at Ambridge, Pa., of U. S. Steel's American Bridge Division attach spirals called "shear connectors" to heavy floor stringers. These, each 49 ft 7 in. long, will be erected in the west approach section of the Hudson river bridge in the 427-mile New York State Thruway

Bros., Olean, N. Y., one of the firm's operating companies and a manufacturer of compressors, will move its Tulsa offices into the new quarters early this summer. Other Dresser subsidiaries will be relocated at the new Tulsa site as soon as present lease commitments expire. Dresser also plans to establish in Tulsa manufacturing facilities which may eventually occupy several hundred thousand square feet of space.

Hall-Mack Enlarging Plant

Hall-Mack Co. is expanding facilities at 1344 W. Washington, Los Angeles, for manufacture of bathroom accessories and medicine cabinets. G. A. Hallenscheid is president.

Drake Building Warehouse

Drake Steel Supply Co., Los Angeles steel distributor, is constructing an office building and warehouse at 6501 Bandini Blvd., that city.

Hazard Expands Wire Works

Okonite Co.'s Hazard Insulated Wire Works Division, launched a $300,000 modernization program at its plant in Wilkes-Barre, Pa. Most of the money will be spent

(Advertisement)

Efficient Stripping of Rejected Painted Parts

When the volume of painting rejects slows your rate of production—as may occur in the manufacture of rigorously-inspected defense equipment—it is time to plan an efficient method for stripping the faulty coatings.

The rejected parts represent a considerable investment in the cost of metal and the cost of fabrication. To hide 5% of your total production in a corner is like hiding 5% of your working capital in a sock. The quicker you reclaim those rejects and push them through as accepted parts, the better profit you make on your contract.

Sometimes the time element dictates more efficient stripping. Suppose a sub-contractor undertakes to produce 100,000 parts in 20 days. Suppose he averages 5% rejects and lets them pile up until he has 5,000 to strip and re-process on the 20th day.

On that day he discovers with sorrow that it is a lot harder to strip and repaint 5,000 rejected parts than it was to paint his regular daily quota of 5,000 new parts. He misses his deadline and suffers embarrassment that could have been avoided by stripping 250 rejects each day for 20 days instead of 5,000 in one day.

Furthermore, it usually is much easier to strip the parts on the day they are rejected. Even though the parts were thoroughly baked in the ovens, it is still true that the longer the paint ages on the metal the harder it is to remove by any method of stripping.

Dumping rejects into a tank for overnight soaking is not always the best way to strip the paint. Some paints that cannot be removed by immersion in any one stripper—be it alkaline or acid or solvent—respond quite readily to a combination of two strippers.

The technique of rinsing is also important. Some paints yield only to a hot alkaline stripper followed by a hot rinse. Sometimes a cold rinse following a hot immersion seems to provide a shock that removes the paint with great speed.

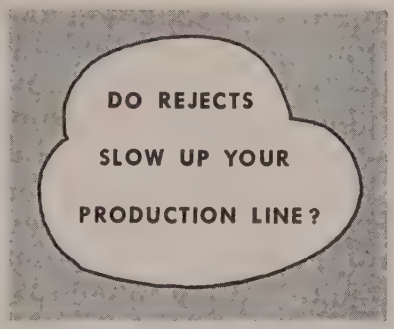
The economy of finding the best stripping method is so great that it merits careful planning. It may also require the advice of a man who has had plenty of experience with all types of stripping operations. Such a man is the Oakite Technical Service Representative in your city.

At the command of the Oakite Representative are more than a dozen stripping materials that work with great speed and efficiency, whether used for reclaiming rejects from the painting line or for stripping conveyor chains, racks and hooks. Among these materials are:

1. Alkaline strippers that remove many types of paints and are also excellent for "killing" the overspray in water-wash paint booths.
2. Solvent strippers that are especially effective on the newer types of synthetic lacquers.
3. A viscous solvent stripper of special value because it adheres to vertical and inverted surfaces.
4. A solvent stripper and an alkaline stripper especially designed for safe removal of zinc chromate primer from aluminum.
5. An acidic material that strips certain organic finishes and simultaneously removes oil and rust.

For more information on this subject, phone your local Oakite Technical Service Representative or mail the coupon below.

Advertisement



When painting rejects slow your production you may need one of the Oakite strippers described in the free booklet "How to STRIP PAINT." The booklet answers many questions that may help you work out better stripping procedures. For example:

¶ What's the cheapest way to strip metal parts in large volume? *See page 9.*

¶ What strippers are best for removing oil base paints? . . . Synthetic enamels, alkali-resistant plastics or resin-based paints? . . . Japans, wrinkle finishes, nitrocellulose lacquers, alkyds, phenolics and ureas? *See page 12.*

FREE For a copy of "How to STRIP PAINT" and for advice on your particular paint-stripping problem, just send us the coupon.

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OAKITE
MATERIALS • METHODS • SERVICE

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Send me a FREE copy of your booklet "How to STRIP PAINT." Also, tell me about your methods for removing the following organic finishes:

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NAME_____

COMPANY_____

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OVER ONE HUNDRED YEARS OF CONTINUOUS SERVICE. ROUNDS, SQUARES, FLATS, HEXAGONS, OCTAGONS

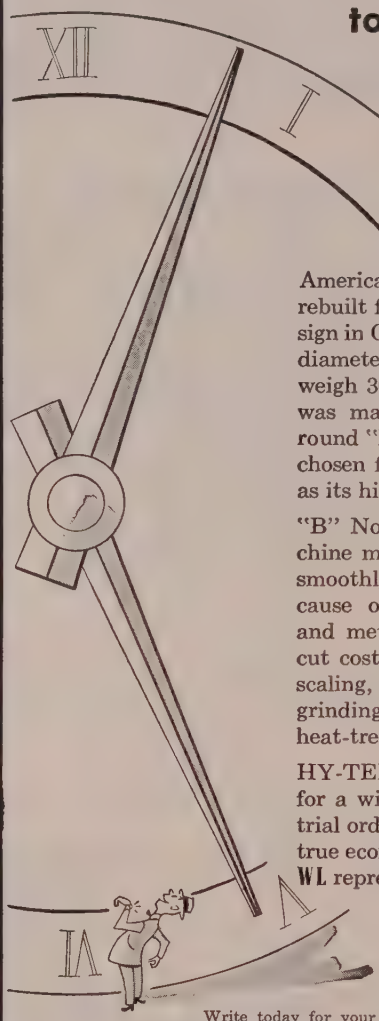
BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS

it's the right time

to Investigate the Qualities of

HY-TEN

ALLOY STEEL

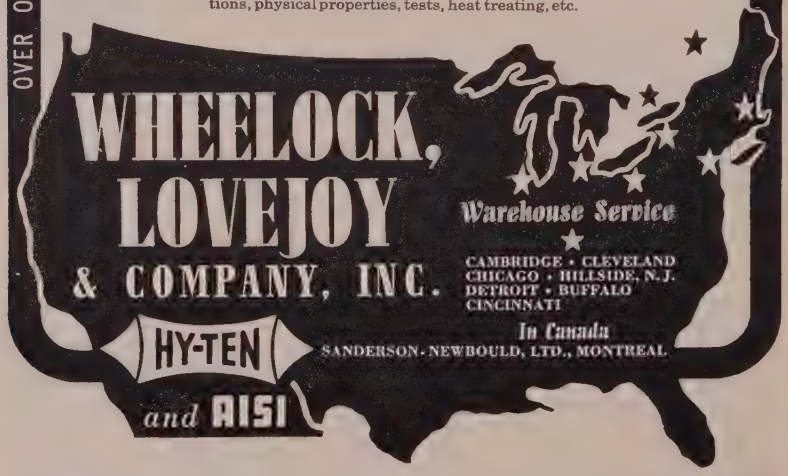


America's largest clock was recently rebuilt for a spectacular illuminated sign in Chicago. It measures 50 ft. in diameter — hands and movement weigh 3000 lbs. The new driveshaft was made from 6 ft. of 3½-inch round "B" No. 3X heat-treated bar, chosen for its machinability as well as its high physical properties.

"B" No. 3X heat-treated bars machine more readily and finish more smoothly than standard alloys because of their particular analysis and method of manufacture. They cut costs by eliminating distortion, scaling, straightening — and often grinding — as well as the cost of heat-treating finished parts.

HY-TEN "B" No. 3X bars are used for a wide range of applications. A trial order will convince you of their true economy. Just call your nearest WL representative.

Write today for your FREE COPIES of Wheelock, Lovejoy Data Sheets, indicating your title and company identification. It contains complete technical information on grades, applications, physical properties, tests, heat treating, etc.



131 Sidney St., Cambridge 39, Mass. and Cleveland • Chicago • Detroit Hillside, N. J. • Buffalo • Cincinnati

for new equipment. One of the biggest single expenditures will be for a lead extruder which will be installed at a cost of more than $120,000. Three additional stranding machines will be installed at a cost of about $20,000 each.

REPRESENTATIVES

Parker Appliance Co., Cleveland, appointed Power Transmission Products, Portland, Oreg., as a distributor for its precision tube fittings line; Hope Rubber Co., Fitchburg, Mass., B. W. Rogers Co., Akron and Cleveland, and Ritter Engineering Co., Pittsburgh, as distributors for its Hoze-lok fittings; Korody Marine Corp., Hawthorne, Calif., as export distributor for its fittings, O-rings and lubricants; and Williams & Co., Louisville, as a distributor for its tube fittings, tube-fabricating tools and related items.

Cerro de Pasco Corp., New York, appointed Die Supply Co., Detroit, as a distributor for its alloys.

Conoflow Corp., Philadelphia, manufacturer of pneumatic final control elements, appointed Cyberno Products Co., New York, and Chemical Pump & Equipment Corp., Cleveland, as distributors in their respective territories.

Roll Formed Products Co., Youngstown, manufacturer of continuously rolled metal shapes, appointed Val W. Ove Metal Products Co., Milwaukee, and Edlund Engineering Co., Lynnfield Center, Mass., as sales representatives in their respective areas.

ASSOCIATIONS

William J. Bulman joined the staff of **National Foundry Association,** Chicago, as assistant to C. T. Sheehan, executive secretary. Mr. Bulman formerly was special agent of the Federal Bureau of Investigation, Washington.

Stockholders of **Lake Carriers' Association** elected two Cleveland men to the board of directors: W.

(*Please turn to page* 86)

at one of the world's largest automotive plants 37¼ seconds for 28 operations

JOB FACTS:

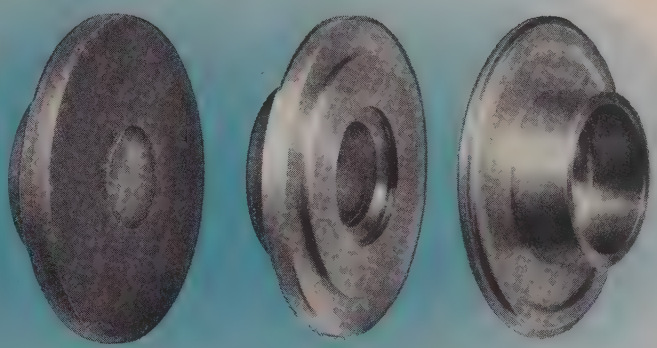
PART.....Torque Impeller Hub.
SIZE.....4" diam. 1¼" long.
MATERIAL.....Steel forging, SAE 1146 annealed
MACHINES: 6 inch model RPA-8 Acme-Gridley Chucking Automatics.

1ST MACHINE, with double index and duplicate tooling finishes 2 pieces per cycle—each with 11 identical operations. All carbide tooled.

Machine Time: 22½ seconds—320 per hour.

2ND MACHINE, single index with one set of tools completes opposite side to 17 operations. All carbide tooled.

Machine Time: 26 seconds—138 per hour.



WITH 100% CARBIDE TOOLING ON 8-SPINDLE

Acme-Gridley Chucking Automatics

IN this most competitive big business all planning must be toward higher consumer acceptance in both quality and purchase price—and leave a profit for the effort.

All three of these prime essentials begin with small parts such as these and hundreds of others made on multiple spindle chucking automatics.

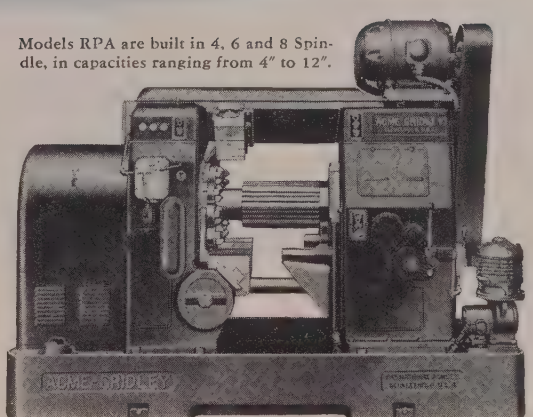
Alert, continuous and critical study is given to the most minute detail for manufacturing improvements, accepting only those which will:

- **save a fractional second in time per piece**
- **avoid rehandling on extra machines**
- **release valuable floor space**
- **relieve costly man-hours for other work**

—all to the end of achieving better components at lowered factory cost.

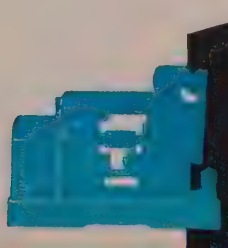
For more than 20 years Acme-Gridley machine design engineers and tooling specialists have helped meet these vital needs—by improving basic machine stamina, by ingenious applications of fastest cutting carbide tools, by simplifying operator effort. All of which applies to multiple chucking operations and to bar machine performance.

Models RPA are built in 4, 6 and 8 Spindle, in capacities ranging from 4" to 12".



Regardless of the particular kind of mass production parts, let us show you how to put Acme-Gridleys to work in your plant—MORE PROFITABLY.

Remember—your market also must be protected against competition if you expect to make a profit.



The NATIONAL ACME COMPANY

170 EAST 131st STREET • CLEVELAND 8, OHIO

ACME-GRIDLEY BAR and CHUCKING AUTOMATICS

1-4-6 and 8 Spindle • Hydraulic Thread Rolling Machines • Automatic Threading Dies and Taps • Limit, Motor Starter and Control Station Switches • Solenoids • Contract Manufacturing

To turn **more** of your metalwor

Put the strength

138,000 Management, Production, Engineering and Purchasing executives in metalworking read it . . . use it . . . depend upon it!

ospects into **customers**

STEEL

into your advertising program

(*Concluded from page 82*)

A. Sterling, president, Cleveland-Cliffs Iron Co., and R. H. Lucas, assistant to the president, Pittsburgh Steamship Division, U. S. Steel Corp.

NEW ADDRESSES

Malls Co., manufacturer of metal trays, waste baskets, desk sets and other items, and the firm's subsidiary, **Tole Craft Products Inc.**, will move by July 1 into a plant now under construction at 3031 James St., Baltimore.

Micro-Precision Inc. is conducting manufacturing operations in its new plant in Evanston, Ill. Formerly located in Chicago, the firm specializes in the manufacture of all types of hydraulic controls and fuel injection equipment. Micro-Precision is a subsidiary of Micromatic Hone Corp., Detroit.

Life Time Products Corp. moved into its new executive offices at 12014 Wilshire Blvd., Los Angeles.

Detroit Sheet Metal Works moved its general offices and engineering department to its new plant location at 14341 Schaefer Road, Detroit 27.

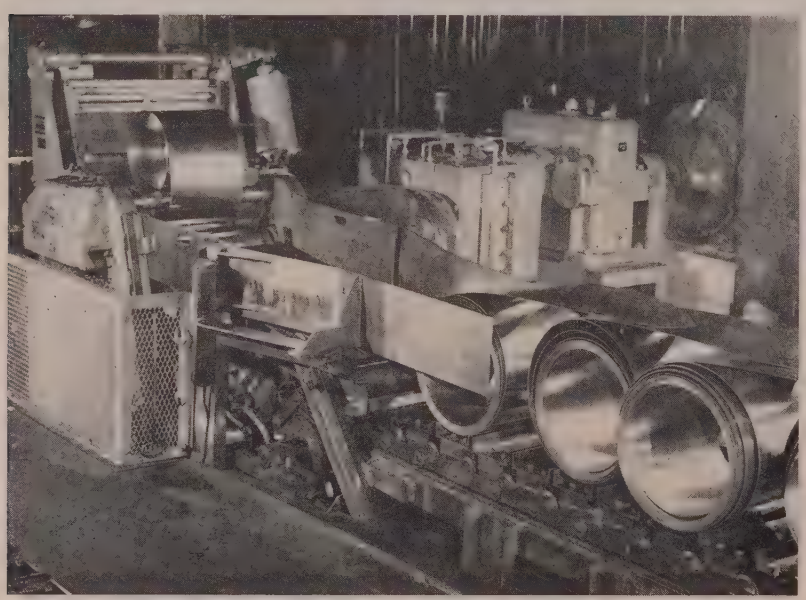
Surface Combustion Corp., Toledo, O., moved its Chicago Industrial Furnace Division office to 116 S. Prospect, Park Ridge, Ill. W. O. Owen is district manager.

Independent Scrap Iron Corp. moved its plant and offices to 14 N. 12th St., Brooklyn, N. Y. Arnold L. Weinstein is president.

ANNIVERSARIES

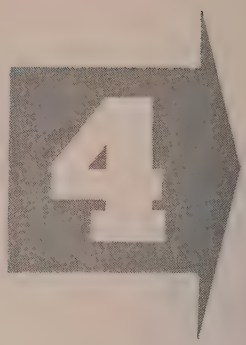
Smith & Caffrey Co., Syracuse, N. Y., observed last month the 60th anniversary of its founding. This firm, operating a steel warehouse and a structural steel fabricating plant at present, was established in 1894 as a foundry. D. C. Park is president.

Dresser Industries Inc.'s Roots-Connersville Blower Division, Connersville, Ind., is celebrating this year the 100th anniversary of the discovery by the Roots brothers of a principle for creating positive mass movement of gas and air that has remained basically unchanged.



Bigger Muscles for Coiling Brass and Silver Alloys

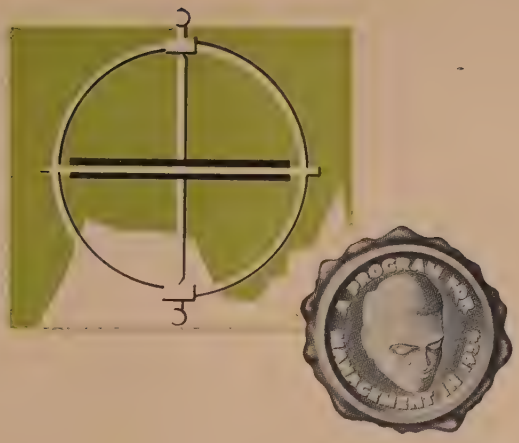
Three-roll pyramid upcoiler, built by E. W. Bliss Co., Salem, O., for American Brass Co.'s Waterbury, Conn., plant, coils 0.400-in.-thick brass and silver alloys in widths up to 25 in. The new upcoiler replaces equipment which could not coil brass alloys thicker than 0.280 in. With certain mild steels, the new equipment can handle thicknesses up to 0.4375 in. and widths up to 28 in.



STEEL's 1954 Management Series . . . .

The editors of STEEL herewith present the fourth in their ten-part series, Program for Management for 1954. The complete list:

1. **Now You Have To Sell** (Feb. 22, p. 91)
2. **Build Better Bosses** (Mar. 22, p. 81)
3. **Automation—How Far Should You Go?** (Apr. 12, p. 87)
4. **Stabilizing Production, Employment**
5. **Distribution—Integration Needed**
6. **Distribution—Training Personnel**
7. **Distribution—Transportation**
8. **Product Diversification**
9. **Foremen—Bridge to More Efficiency**
10. **Product Design**



Stabilizing Production and Employment

MANAGEMENT IS going to find it tough to look good to the public on the guaranteed annual wage.

Partly it's the old problem that economic terms like overhead and demand sound phony compared with bread, butter and babies. But mostly it's because union pressure for a guarantee of annual wages contains the unmistakable indictment that management has failed to do its job.

Management has already demonstrated its practical concern for the economic security of the worker as a necessary part of sound management policy. Its labor program today includes pension plans, group insurance, layoff notice, vacations with pay, dismissal notice compensation, sick leave and call-in pay.

How Far?—The problem of establishing a guaranteed annual wage is not one of creating a new point of view with respect to the security of employees, but rather one of determining how far it is feasible to supplement measures already taken in that direction.

The challenge to management lies not merely in the fact that the annual wage is interwoven with strong social, moral and economic pressures for security, but more importantly in the fact that the very stabilization inherent in the climate for the guaranteed annual wage is synonymous with fundamental business objectives and increased productive efficiency.

Initiated by Employers—It is for that reason that the bulk of annual wage programs in operation now and in years gone by were initiated by management itself.

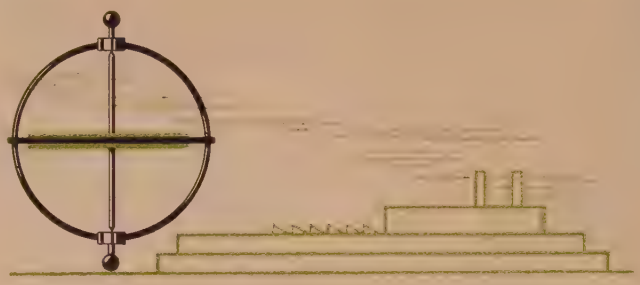
What exactly is the guaranteed annual wage? Perhaps the most definitive description explains that "the guaranteed annual wage is whatever Mr. Reuther and the auto companies agree upon." But in its pure and literal sense, a guaranteed annual wage would involve a pledge to pay employees a full-time pay check at regular pay periods throughout the year regardless of business exigencies.

Such a guarantee was suggested by the Steel Panel in World War II before the War Labor Board in what has since been termed a "trial balloon." It may be said that the balloon could hardly have failed to rise beautifully for it contained the unimaginative request of wages for 52 weeks annually of 40 hours each with overtime for hours above 40 in any week.

Today's Plans — Most "annual wage" programs in effect today, however, do not contain such a Utopian concept and may be divided into one of three types: Guarantees of minimum working time, guarantees of minimum annual pay and supplementation of earnings in slack periods.

One of the largest firms to operate under the guaranteed workweek agreement is Swift & Co. However, the number of hours accepted by Swift as a full work week has varied between 32 and 40. Also a time guarantee is the agreement of Wildman Mfg. Co. which underwrites 1200 hours employment annually or that of Procter and Gamble Co. which pledges 48 weeks of employment during the year to those with two consecutive years of service or more.

Supplementary—More nearly of an annual nature is the plan in effect at the Parker Mfg. Co. in Worcester, Mass., which guarantees



What Stabilization Can Do for You

• *Lower Overhead*—Steady employment and steady production mean better utilization of plant and equipment with less idle time.

• *Lower Unemployment Tax*—Unemployment compensation taxes are imposed in many states on the company's "historical" employment record. Steady employment cuts such taxes.

• *Less Overtime*—Better production planning means less "emergency work" with costly overtime.

• *Lower Inventory*—Lower warehousing requirements for incoming materials inventory and more adequate stocks for customer service can be planned. That not only prevents excessive carrying charges but can reduce loss in a falling market.

• *Smoother Capital Planning*—Knowing what's coming and planning for it includes a close estimate of profit and loss, the basis for estimating cash requirements, and aids in long-term programs of expansion.

• *Real Sales Goals*—Knowing the planned production rate, the sales department can plan its own targets and how it will reach them.

• *Improved Employee Relations*—Security in his job gives the individual worker greater faith in the American economic system and in the employer. That reflects in higher morale and higher output per man-hour.

• *Inactive Purchasing Power*—Many economists believe that security in his job also will stimulate the worker to spend his income. When the worker spends and pockets of savings are eliminated, the economy is stimulated over-all.

1800 hours annually to employees with more than five years of service. In effect, the guarantee makes up the financial difference between the employee's total income in money earned inside and outside the plant together with any unemployment insurance to give an income equal to 1800 hours at his standard rate. The general principle of this program parallels closely the thinking of the CIO at the moment.

Leveling Peaks, Valleys — Most widely cited example of a guarantee of the second type, minimum annual pay, is found in George J. Hormel & Co. This guarantee is effected through crediting overtime accrued when the firm is busy against undertime when work is slack thus leveling the peaks and valleys to provide 52 weeks pay at regular time for main plant employees. Surprising as it may seem, this program parallels closely the thinking of much of management on the GAW, something to be taken up below.

Also of wide interest is the plan in effect at Nunn-Bush Shoe Co. since 1935 which sets wages at a fixed percentage of anticipated sales. Accordingly the wages of workers are prorated on a basis that gives customary differentials among the classes of workers with a weekly pay check of uniform amount through the year. The difference between the sum of the pay checks and earnings is set into a reserve fund during surplus years to be drawn upon to maintain wages in the event of short-term deficit.

Earnings Floor — International Harvester Co. provides a case of the third type in which a fund is set aside to make up pay for under-employed workers to total 60 per cent of their full-time weekly earnings. Similarly, in plans previously in effect at General Motors Corp. and Armstrong Cork Co., employees with requisite service were permitted to draw cash advances in layoff periods up to 60 per cent of their standard wages. These advances were then deducted from earnings when the employee's pay returned above 60 per cent.

These examples make clear a peculiar dilemma of the guaranteed annual wage. Either the company may offer a great deal to a few

workers, or considerably less to a greater number of workers. For should it make its commitment conservative enough to be carried out even through a depression, it will offer little to most of the workers. And should it offer definite security to the bulk of the employees, there is strong probability of forced abandonment of the plan when the going gets rough.

Coverage Limited—As a result, most annual wage programs are found to apply to a small inner core of the workers who have already enjoyed continuous employment during a number of years and would be the last to be laid off whether they had such a guarantee or not. This is true not only of plans initiated by management, but also of those initiated by unions.

It is apparent, therefore, that future discussions of the guaranteed annual wage will hinge on the comprehensiveness of the coverage as well as the rigidity of the guarantees.

Consumer Goods Stable — But perhaps most significant of all, it is to be noted that most companies cited in the examples above manufacture consumer goods. Contrasted with durable goods which by their nature are deferrable purchases, most consumer goods obtain a demand pattern relatively predictable. And it is upon the predictability of demand that production hinges and in turn employment.

Stabilization First — Historically management has been able to achieve relatively stable employment first and formalize an annual wage agreement second. Today in traditionally tempestuous durable goods, management is confronted with the anomaly that the annual wage will come first. Second will come either employment stabilization or crippling overhead.

Although its plan is called a "guaranteed wage," the UAW points out that "our purpose is really to develop a guaranteed employment plan . . . our main objective is full-time employment, week by week, the year around." The guarantee, notes the UAW, will provide an incentive to management to stabilize employment.

Everyone Wants Stabilization — The problem is that it has been no

Analyzing Your Company's Stabilization Problem

• THE THREE FACTORS involved are employment, production and sales. Convert monthly totals in each one of these categories to a per cent of the 12-month average in which the month falls and plot all three figures on a graph. (In most cases prewar figures will prove best since postwar conditions distort the normal competitive picture as in the auto industry example shown on p. 90.)

Questions like these will help pin-point your trouble areas:

1. Do production and employment tend to rise earlier in the year than the sales as inventories are built up or do they lag behind sales as inventories are reduced?

2. Do unusual fluctuations occur within the year as compared with the average for the year? In sales? Employment? Production?

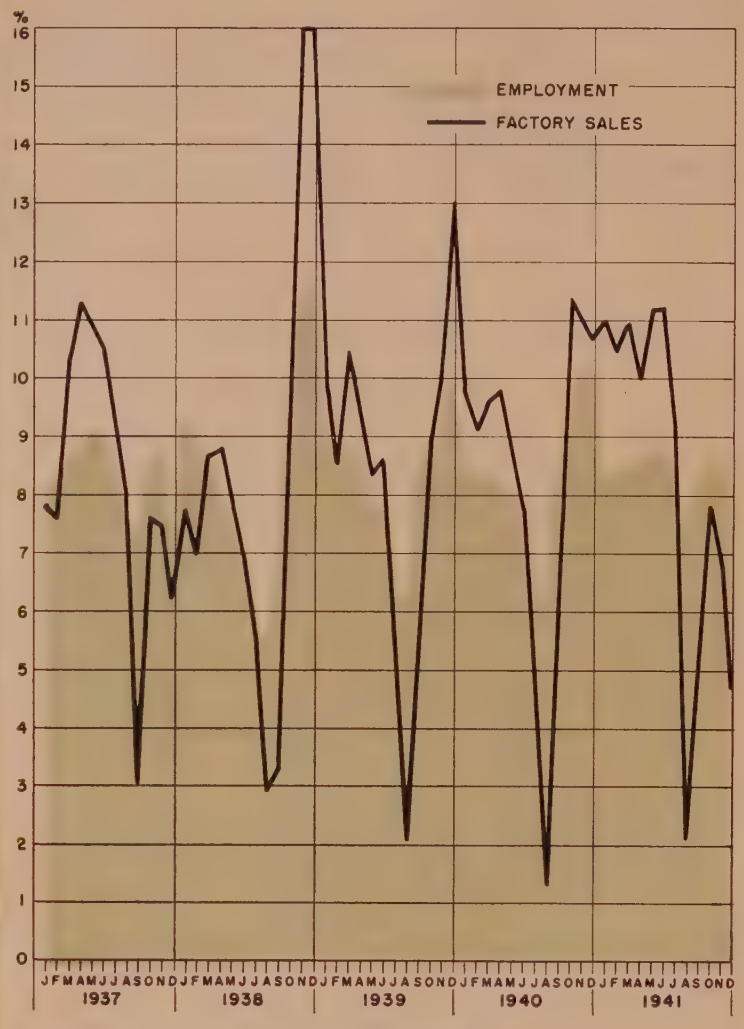
3. Can a pattern of monthly fluctuations be seen regularly recurring in sales, employment and/or production year after year?

4. Are production and employment changes related to sales changes?

5. Are sales changes related to factors which may be clearly identified as seasonal?

6. Is the trend over the year directly related to the gross national product or Federal Reserve business trend index? Can a regular rate of growth be discerned which will aid in planning for the future?

How Auto Employment and Sales Rise and Fall



Source: Bureau of Labor Statistics and General Motors Corp.

EMPLOYMENT—man-hours performed per month, expressed as a percentage of total annual man-hours performed in the automotive industry.

FACTORY SALES—unit sales per month expressed as a percentage of total annual U. S. passenger car sales.

secret in the past to management that everyone benefits from steadier operations. In most plants any fluctuations above or below normal levels of operation increase costs. When operations go up it means overtime and training new men. When operations go down it means idle equipment in the face of continuing overhead. In addition, the favorable effect of security on employee morale and in turn on production has long been realized. Management has never doubted for a moment that it could gain a great deal from stabilization.

Factors in Fluctuation

The fundamental question of the union proposal for a guaranteed annual wage is whether or not incentive actually has anything to do with the basic previous inability of management to stabilize production and employment.

Cyclical and Seasonal—Underlying instability are two basic types of business fluctuations. The first are cyclical fluctuations in business generally which climax in either depression or boom. But within cyclical fluctuations are the second type of fluctuation involving smaller segments of the economy known as seasonal fluctuations. These seasonal fluctuations are most noticeable during ordinary times of reasonable prosperity such as the period many observers feel the economy is now entering.

It is these minor fluctuations of business that have been getting and will continue to receive the increased attention of management, contributing only indirectly to the reduction of major fluctuations as well. For while it is generally conceded that there is little the individual company or even an entire industry can do about cyclical fluctuations, experience has shown that there is much management can do to even out monthly and seasonal peaks and valleys.

Two Approaches — Two general approaches to the stabilization problem are apparent: Either the company must stabilize production through elimination of sales fluctuations directly, or it must stabilize production in spite of such fluctuations in sales.

An interesting example of how sales fluctuations were ameliorated involves General Electric Co. packaged air conditioners. Traditionally these units sell heavily during the spring and summer months, drop into the doldrums in the fall and winter. But now the units are actually selling more heavily in winter than during the other seasons of the year.

Incentives—This change in buying habits has been brought about through special winter prices for distributors, dealers and consumers; up to six months' deferred payment for distributors; factory and distributor aid in warehousing for dealers; and provision for 10 per cent down payment for dealers with nothing to pay for six months and no interest charges.

Another technique for changing seasonal buying habits is found in the auto industry, noted for its new

model type of annual sales stimulation. Originally the new models were introduced in the spring, corresponding with the normal incentive to buy as warm weather approached. But as a result, the spring sales peak was many times higher than sales at any other time during the year involving considerable dislocation of manpower and equipment.

Shifting the Peaks—About 1935, however, it was agreed that in the future new models would be introduced in the fall. As a result of this practice, the former single peak in demand has been supplemented with a second peak in the fall following the new model introductions.

The second approach, that of ignoring short-term fluctuations in sales, was attempted by Packard Motor Car Co. some years ago. Determining as closely as possible the demand for the coming year, Packard then scheduled production in twelve equal monthly increments. During the periods of low demand, the cars were warehoused in dealer facilities and in conventional warehouses in major cities, but the plan had to be abandoned when demand became erratic in the depression.

Prorating Output—Other industries have used similar approaches. Toymakers, for example, confronted with a seasonal peak at Christmas of almost 70 per cent of their annual $400-million output, have generally moved to prorate their production over the entire year or have adopted other products or contracted for jobbing work to even out their operations.

Lionel Corp. has recently moved to stabilize its production through introducing a 3-D camera outfit into its manufacturing line which is expected to peak in summer, complementing the winter peak in toy trains.

Problems Vary—The techniques for stabilizing employment are generally known, and a cursory summary is provided in the tabular material on these pages. Some management is taking a new look at these techniques; you may wish to do so also. As a preface, however, it should be pointed out that the problems of each company and even of different departments within the same company are different. It would therefore be presumptuous to present the material as anything more than a basis for further exploration.

The Success Factor

It should be pointed out further that the success of such techniques in leveling production on an annual basis is predicated on the assumption that management can predict with reasonable accuracy the total production to be stabilized for the year. Obviously it is impossible to properly schedule production over the short pull unless you know the approximate goal being sought in the large pull.

Buyers Aren't Statistics—Unfortunately, the most refined business forecasting techniques still cannot take into consideration the psychological snow-balling that starts a recession or a boom rolling.

One economist has commented, "Management could afford to give Mr. Reuther his guaranteed wage if he in turn could guarantee that the money would be spent." Perhaps the further qualification is needed that the purchasing power be disciplined to purchase in the area where payrolls need the most support.

For while one of the major arguments advanced by the UAW is that the guaranteed wage, affording economic security, would tend

What Would Guaranteed Annual Wage Cost?

General Motors Corp. attempted to answer that question for its operations by assuming various GAW conditions and finding out what would have happened if the conditions had been in effect in 1937-41. GM would have been obligated to pay for:

5%

MORE MAN-HOURS
than were actually worked

if 1200 hours

were guaranteed and all employees with one or more years' service were eligible

5%

MORE MAN-HOURS
than were actually worked

if 1800 hours

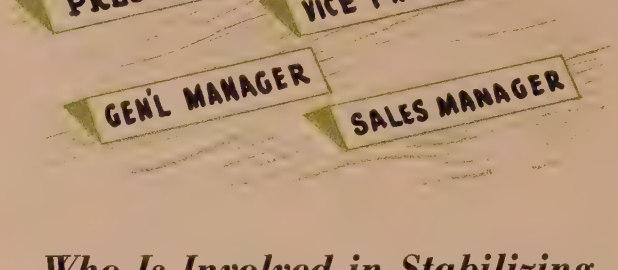
were guaranteed and all employees with one or more years' service were eligible

25%

MORE MAN-HOURS
than were actually worked

if 2000 hours

were guaranteed and all employees with five or more years' service were eligible



Who Is Involved in Stabilizing Your Firm's Employment?

• THE JOB is too large for a single department, yet without a definite assignment of responsibility little is accomplished. In all cases the job is one that must be organized and directed by top management. Without such sponsorship and the co-ordination it takes to run the business successfully little positive action can be expected to result.

In large firms a single member of the board is often assigned the co-ordinating function. In small and medium sized companies, the president or general manager usually assumes the responsibility himself. Often, too, in larger firms operating staff officers or a committee of staff or board members will take over the responsibility for such a program.

But it is important to note that whether a single executive or a committee carries the responsibility for formulating and guiding the program, the actual work must naturally gravitate to divisional and departmental executives in the fields of production, purchasing, personnel and sales. Thus, transfer of workers from one department to another as slack periods develop would be done by personnel, stimulation of off-season sales would come from the sales department, etc.

to create active purchasing power, it must also be pointed out that it would only be a tendency. An aura of universal optimism is difficult to conceive as springing from the security of only a small portion of the total labor force.

Desirable but Difficult — That such optimism is desirable is at once conceded by management. The question is: How do you achieve it? How do you stabilize over the long pull? How do you accomplish the stabilization of employment which at once makes the guaranteed annual wage possible and unnecessary?

Union Answer Too Glib—The union approach to the problem of employment stabilization is much too ready an answer, much too distinguished for the questions it raises than for those it settles. Unless stabilization of employment has actually been achieved, the imposition of supplementary unemployment compensation can only add a burden to overhead. The union may argue that the greater the burden, the greater the "bolstering of purchasing power." But the probable bankruptcy or governmental underwriting of many marginal firms is an extreme price to pay for the dubious "bolstering" to be gained.

In addition to being a burden to overhead, the annual wage liability would act as a double deterrent on business expansion. Not only would the funds available for expansion heretofore be reduced to overhead but the expansion itself would entail the hiring of more workers in turn incurring more fixed overhead and increasing the investment and the risk.

Discourages Job Seeking — And additionally, in its present form of supplementary unemployment compensation, the guaranteed annual wage inevitably leads the union up against the hard fact that a man who is paid for not working is unfortunately less inclined to work. Within the union itself it is significant to note that the worker with the most seniority benefits least from the guarantee while the relatively new worker gets the "vacations with pay."

Matter of Tactics

The only thing that appears certain about the union proposal is that it will be pushed hard.

Foot-in-Door Demands — What business will do in the face of demands for supplementary unemployment compensation is a subject implicit with considerations both of expediency and economic statesmanship. Observers agree that initial annual wage moves will be largely to establish precedent for future gains. The union doesn't intend to do the job at the first crack but will get its foot into the door and then work to expand the number of employees covered and the amount of their coverage.

Aware of that situation, business may choose to take a stand on the fundamental issue. Thus far, however, there are few outward signs that business is united in a position against the union demand.

This poses the question of whether a larger firm might not concede the issue to gain competitive advantage over its smaller competitors. For in this eventuality, the smaller firm would thus be con-

fronted with either a long and costly strike or the alternative of making the same concessions of overhead which the larger firm could better afford to bear.

Counter Proposal—It seems improbable that either of these courses of action will be followed, despite some occurrences of that type during pension negotiations a few years ago. What does seem likely, however, is a counter proposal on the part of management.

One major auto company looks upon the basic problem of the annual wage with a certain amount of sympathy. It differs with the union, however, in that it believes the basic form of the solution lies in shoving the labor income peaks into the valleys. The union proposal, of course, would in effect bolster up the valleys leaving the peaks intact. What this company may propose, therefore, is an arrangement through which the overtime periods are credited against the undertime periods similar to the Hormel plan.

Balancing Overtime, Undertime—The reasoning behind this proposal is easy to understand. For the net effect of the union proposal is to add a penalty for undertime to the overtime penalty the company already pays. The company reasons that with the seasonal fluctuations in the auto industry which involve extensive overtime during certain periods of the year, it could afford to pay the undertime with perhaps only a partial reduction in its overtime bill.

The opinion of the union against any curtailment of overtime has already been expressed. It may be expected to argue that retention of overtime contains a stronger incentive for management to stabilize employment as well as citing the principle of extra pay for extra effort.

Works Two Ways—But if the union is sincere in its effort to seek "full employment, week after week, the year around," this position is open to question. The objective of stabilized employment is the elimination of overtime as surely as it involves the elimination of undertime.

Even more important, there is a real question whether guarantee of

Stabilization Techniques You Can Use

• THERE are two broad approaches which the individual company may use to stabilize its operations: First, it may attempt to reduce fluctuations in its sales; and, second, it may stabilize production and employment directly despite fluctuations in sales.

Such techniques as those shown below are primarily applicable to seasonal fluctuations rather than cyclical fluctuations, and greatest success may be achieved if both broad approaches may be used together.

1. Stabilizing Sales

(A) *Off-season Sales Promotion*—Increased advertising during slack periods, special incentives for sales force and dealers and introduction of new styles or new models all help stimulate off-season demand.

(B) *Financial Sales Incentives*—Financial inducements which may be offered to customers in the form of price reductions, protection against price changes and invoice post-dating stimulate purchases.

(C) *Special Sales Arrangements*—Seasonal merchandise often may be leveled in sales through the use of consignment shipment, the leasing of equipment and the provision of warehousing service for customers.

2. Market Diversification

(A) *Geographic Market Diversification*—Seasonal items can be sold in other parts of the country or other parts of the world in many cases when the regular market tapers. South America is a particularly good bet with its reversed climate.

(B) *Industrial Market Diversification*—Planning your products so you sell to a wider variety of industries with different seasonal patterns means the company is not dependent on sales to any one industry. Such a mixture can often lead to complete stability.

(C) *Off-Season Contract Work*—If your company lacks the funds or resources to tackle a new product itself, idle capacity often can be filled with contract work for other firms during a period of the year.

Daco Machine & Tool Co.

Personnel Planning

• Technological advancement has done much to increase labor flexibility. But further union concessions on job switching within the company must be made in the interests of stable employment. Within the union and operational limits of your firm here are a few things that can be done:

1. Tool up for planned employment by establishing—
   (A) Prospective work schedules
   (B) Job descriptions
   (C) Adequate qualification records for each employee

2. Revamp employment and transfer procedures to co-ordinate hirings, firings and layoffs

3. Hire for versatility—
   (A) Varied abilities
   (B) Willingness to transfer to other work as required

4. Train for versatility—
   (A) Determine training needs in advance
   (B) Use appropriate training methods

5. Avoid or delay layoffs and temporary hirings. To that end—
   (A) Adjust the work week to production levels
   (B) Encourage vacations and leaves of absence during slack periods
   (C) Establish groups from which emergency personnel needs may be filled

6. Develop a wage structure and wage administration methods that will facilitate employee acceptance of the necessary transfers

7. Enlist supervisors' support in the plan—
   (A) Explain the purpose and methods of the plan
   (B) Free them of routine so they are able to carry the heavier burden of the plan

8. Seek the co-operation of employees and the union—
   (A) Work toward increased individual productivity
   (B) Establish policies for all employee relations matters
   (C) Arrive at working agreements on methods and objectives to eliminate strife

payroll tenure is properly the way to achieve full employment on a permanent basis. Is not the opening of new job opportunities and the possibility of advancement fundamental to full employment as well? New industries must continually be developing to expand and grow as older ones decline.

Labor Must Be Flexible — More basic still, is not one of the strongest factors in a full employment picture a flexible labor force? The technological advances of industry in such fields as automation have done much to make it possible for a man to leave one machine and move to another on which he can produce just as efficiently without prohibitive training.

Technology has in effect broadened the ability of every man working in a plant, enabling him to perform jobs he could not have done previously. And the strongest deterrents to that flexibility are union rules concerning who may do what job and who may not.

Stabilizing employment is not a new issue. It has long been recognized that stability of employment was in the interests both of management and labor. For labor it means security and for management lower costs. Properly planned and carried out, much good can come of intelligent steps to stabilize employment.

The danger lies in rash demands either on the part of labor or of management which could endanger our fundamental economic system. For a program of prohibitive overhead imposed on industry could only result in a drying-up of business expansion, a move to government underwriting and eventually government control of business.

Security To Grow—It was inevitable that the historical growth of big business in this country would in turn be accompanied by a growth of big labor. The important thing is that that bigness be used for further growth. For the kind of thinking that dictates "we must hold on to what we have as there is no longer enough to go around" can strangle further growth by restrictions.

Stabilization of employment is an objective worthy of full labor and management co-operation. But it must mean security to grow, not stagnation.

The longer rolls stand up before changes, the higher the production and the lower the operating costs.

The ideal hot strip mill combination for accomplishing these advantages (proved in today's mills) is Mack-Hemp's famous Anniversary Rolls (special Nironite) in the intermediate stands and Nironite F Rolls in the finishing stands—backed up with M-H Technalloy Special Rolls.

The unparalleled performance you can expect from such a mill is due in a large measure to the fine assistance mill roll designers and operators have given to Mack-Hemp metallurgists—plus Mack-Hemp's careful consistent control of metallurgical properties, and close check of every step in casting, heat treating and finishing. The fine grain type Nironite work roll with its hard surface and tough inner core and neck structure is an example.

This "know-how" embracing over 150 years of roll making experience, backed by continuous research, is the mill operator's assurance of rolls that always meet their specific requirements.

So, keep your eye on what's new and different at Mack-Hemp . . . it's your sure way of keeping well ahead of productioneering problems.

MACKINTOSH-HEMPHILL COMPANY

Makers of the rolls with the striped red wabblers

PITTSBURGH AND MIDLAND, PA.

MACKINTOSH-HEMPHILL PRODUCTS INCLUDE: all types of cast mill rolls . . . improved Johnston patented corrugated cinder pots and slag handling equipment . . . Mackintosh-Hemphill rotary straighteners —electronically controlled contouring lathes—screw feed roll turning lathes—heavy duty engine lathes . . . shears . . . end-thrust bearings . . . steel and special alloy castings . . . reversing hot strip mills . . . Y-type cold strip mills

tubing shapes up like this at OSTUCO

We start with these basic shapes . . . then we forge and fabricate carbon and alloy steel tubing to your exact specifications all under one roof. One purchase order takes care of all details. If you would like to know more about our "single source service," send for our newest catalog, "OSTUCO Tubing" . . . better yet, send your blueprints for prompt quotation.

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OHIO SEAMLESS TUBE DIVISION
of Copperweld Steel Company • **SHELBY, OHIO**
Birthplace of the Seamless Steel Tube Industry in America

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Technical Outlook

OXIDATION IN LUBRICANTS—Ways of detecting chemical changes that occur during oxidation of lubricating oils and greases are described in a report made public by U. S. Department of Commerce. Infrared and mass spectrometric techniques described are designed to reveal end products of oxidation, providing a basis for comparative evaluation of lubricant stability.

CARBIDE FUTURE—Big potential use for cemented carbides is in machine tool quills, spindles, slender boring bars, etc. High modulus of elasticity makes the material a natural for resisting bending. Philip M. McKenna, president, Kennametal Inc., Latrobe, Pa., comments that on some bore grinding operations, elimination of a tapered hole due to quill distortion has helped to pay for the carbide quill in about 3 days. He sees this application of carbides as offering great potential for future development.

GROWING IN POPULARITY—More consumers are being sold on the high-strength low-alloy steels as they prove their advantages in an ever-increasing number of manufacturing applications. And with design trend noticeably in the direction of less weight without loss of yield strength, the steelmakers are predicting a constantly broadening market for products in the high-strength low-alloy category. Corrosion resistance also is a stimulant to wider use. Last year some 750,000 tons were marketed, according to Ross Wilkins, assistant vice president and general sales manager, Great Lakes Steel Corp., Ecorse, Mich.

WELDING BAROMETER—Bolstered by sales of nearly $614 million in 1953, welding people see a bright future for themselves and industry as a whole. In the words of Fred L. Plummer, AWS president, speaking at the society's spring technical meeting at Buffalo last week: " . . . we are enjoying the experience of having mounted the first step of an upgoing escalator, the first stage of a peacetime boom, which may be far greater than any this land of ours has ever known." Welders are particularly enthusiastic about the role their industry will play in automation. Many of the 98 exhibitors featured it. Other exposition highlights included what appears to be a new emphasis on hard facing and special electrodes for special properties. Some 10,000 attended the meetings and exposition.

TITANIUM—You can greatly increase the creep resistance of titanium and its alloys by a small amount of reduction during cold working. Further cold working continues to increase resistance but at a decreasing rate, according to a U. S. Air Force report. Study involved titanium and two of its alloys.

JET PRODUCTION—In a press conference at the American Society of Tool Engineers' show in Philadelphia, Sir Walter Puckey attributed Britain's lead in jet aircraft production to the "traditional British pattern of never staying with any single type of product. Even with this lead, engine design still stays ahead of industry's ability to produce." Sir Walter, deputy controller of supplies for aircraft production of the British Ministry of Supplies, added: "Unless there is some standardization in the various methods that might be and are being used to produce the new jet engines, there will never be sufficient production to meet requirements."

ANOTHER NOTE ON SCRAP—At the Monessen Works of Pittsburgh Steel, that company is reducing expense of handling scrap by making charging boxes out of scrap sheet which is sheared to size. The boxes are fabricated, then scrap is loaded into the boxes and the entire box and its load are dropped into the open hearths. Pittsburgh says this is still experimental, but it should reduce costs.

Metalworking Outlook—p. 39 Market Outlook—p. 137

TEAM APPROACH TO DESIGN

"It is seldom that one individual is an expert in design, in metallurgy and in testing, and it is not desirable to take the time of a good designing engineer to turn him into a poor metallurgist or vice versa.

"There is a too prevalent desire among designers for a reference book to which they could turn for the way out of any particular dilemma in choice of materials, without bothering to think the matter out or to take counsel. This cookbook attitude is a dangerous one and should not be catered to.

"However, it seems reasonable that the designer should ask what usual tests he should have applied to a substitute material and how far he may properly go in the interpretation of test results.

"It is reasonable also that the metallurgist should ask the designer for precise information."—H. W. Gillett

By DWIGHT RILEY
LEO BAILEY
GEORGE WALDIE
Battelle Memorial Institute
Columbus, O.

MATERIALS SELECTION . . .

Teamwork Is the Trend

Designers cannot hope to keep current with the wealth of new or improved materials. Some progressive companies are taking the "two heads are better than one" approach

DESIGN engineers seeking to cut costs and/or improve performance with new or improved materials are generally faced by a shortage of selection know-how. This can be the result of a lack of information or too much information.

Until workable ways are found to keep up with the ever-mounting flood of new and improved materials, many designers must be content to rely on old standbys—at the possible expense of passing up something better on the "lack of information" shelf. At this level, material selection can be an art, involving compromise instead of ultimate solutions.

Companies wanting to be more scientific may use the "two heads are better than one" approach. Other technical men and management join the design engineer on the metal selection team. Here the problem is one of communication and organization—of finding efficient ways to pool diversified information and experience.

Perspective—Both situations are tempered by the fact that new or improved materials generally don't render their predecessors obsolete. When the smoke clears, you'll find materials, new or old, are used where they prove their worth.

The expanding use of steel is an outstanding example of how a versatile, established material can find increasing applications. New materials encroach only on its relative importance in the whole design picture.

In spite of the great surge to plastics, steel production per capita in 1953 was at an all-time high and is expected to go higher this year. Benjamin Fairless says that without an increase in per capita usage of steel, the U.S. will require additional steel capacity equal to that of the new Fairless works every 17 months for the next 20 years.

Lesson here is that justifiable publicity given new materials should not cause us to forget progress is also being made with the traditional materials.

Evolution—The "wonder materials" of engineering design are generally ushered in with much fanfare. Titanium, zirconium, many cermets and some plastics are in this point now. Aluminum and magnesium were similarly lauded a few decades ago. Their history affords insight into what we can expect from newcomers.

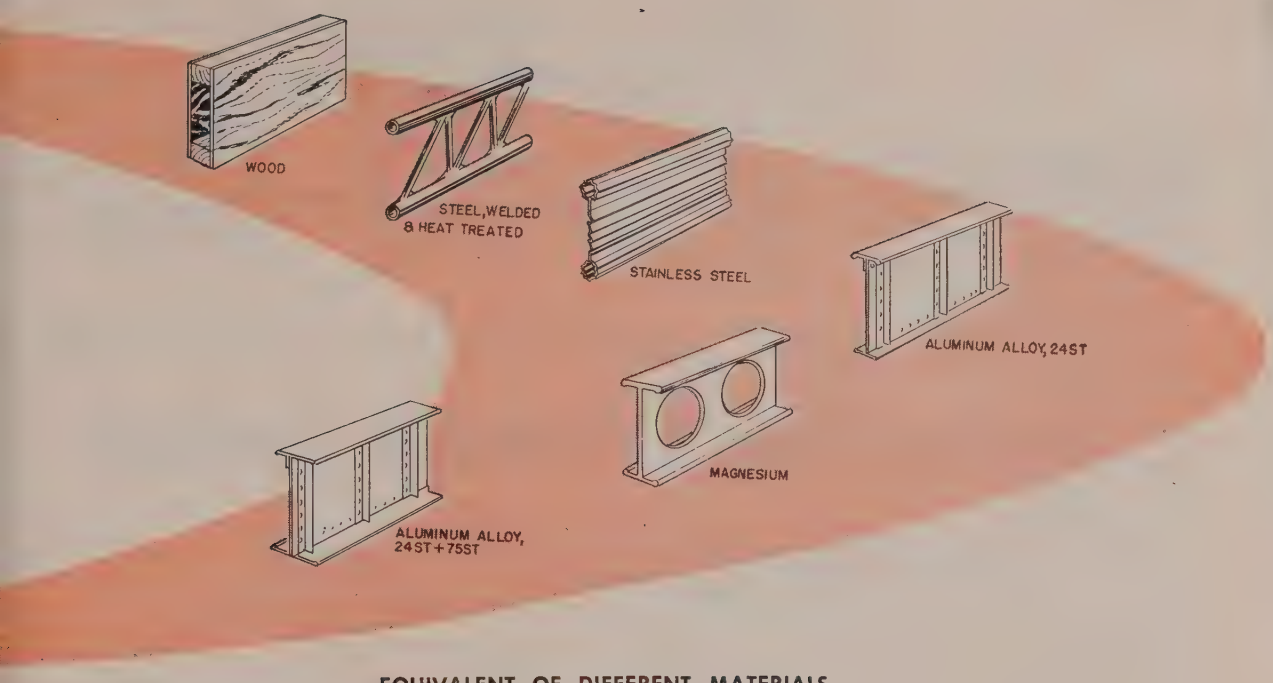
Stage 1. Outstanding physical properties are used to solve engineering problems waiting for a new material.

Stage 2. As the material's limitations and special purpose nature are recognized, there is what amounts to a reaction against it. General-purpose application depends as much on cumulative production experience as interesting physical properties.

Stage 3. If original special applications grow, familiarity and production skill are developed. They may increase demand for the material (encouraging larger-volume and lower-cost production) and broaden its applications.

Clincher—Design is influenced

Today marks the opening of the Second Basic Materials Exposition in Chicago. For additional information on materials selection, please refer to STEEL's special materials issue of last week.



EQUIVALENT OF DIFFERENT MATERIALS

by new materials—plus production techniques, changing styles, prices and performance requirements, but the so-called best design is a compromise offering satisfactory performance at a reasonable manufacturing cost.

Comparative material costs, based on price per pound or cubic inch, leave much to be desired. Today, we tend to think in terms of comparative costs of different materials in "equivalent use." It is recognized that geometry, size and even functional principles can be varied greatly if there is good reason to do so.

Sketches show one designer's conception of equivalent use. Performance of the beams is intended to be roughly equivalent, but design takes maximum advantage of the unique structural properties of each material.

Process—Materials selection for engineering design can be reduced to a series of screening steps:

Step 1. Consideration (usually based on handbooks and company experience) of the product's performance requirements in terms of engineering properties.

Step 2. Materials that may be satisfactory are tentatively selected from among those the company is familiar with, or wishes to become so.

Step 3. Possible choices are trimmed to a few most promising materials—based on known or calculated prices, production costs and market acceptance—but within a "reasonable" budget of time and funds for design.

Step 4. Prototypes are made and tested to make sure that nothing seriously affecting performance or cost has been overlooked.

Carbon steel is often the suitable solution to the design problem in step 2 or 3. It may not be the best material for every application, but its familiar properties, plus its fairly-predictable, low-processing costs, usually put the burden of proof on competitive materials.

Way Out? — Even though the design engineer has a reliable material for his product, the question remains in the back of his mind: "Am I missing a bet with a new or improved material?"

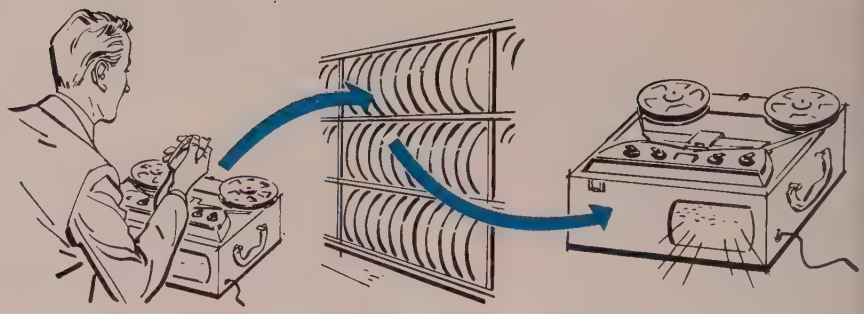
Among the more promising solutions to this problem are the setting up of design teams and general materials conferences or the application of modern, information-handling systems to engineering design.

Close co-operation of metallurgists, corrosion chemists, physicists, purchasing agents, production men and designers is indispensable to good design. One way to cash in on these diverse talents is to set up materials departments or committees to study the problems of design, production and market application of new products or review current items.

"Value analysis" programs are another technique. Generally, this involves the organized review of products and their components in terms of cost and performance. By systematic review, it often becomes apparent that a product (more frequently a component) should be redesigned for better value per dollar spent on materials and production.

Engineers have a much greater body of latently useful materials information than they are putting to work. Much of the best data could be utilized by improved systems of coding, classifying and filing design information.

ANOTHER STEP . . .



Recording of sound on magnetic tape employs same principle . . .

Toward the Automatic Factory

Just as we record sound, General Electric Co.'s record-playback replays production impressions. It promises to be a bonanza of automatic programming on small-quantity parts

SPECIAL MACHINES available to small-lot producers . . .

Complete flexibility to produce a variety of parts in small and medium quantities . . .

Completely automatic machining of parts too complex or time-consuming for hand operation . . .

Repetitive accuracies comparable to tracer control systems . . .

These are some of the most significant effects projected by General Electric Co. for the production development it terms Record-Playback Control. The system is chiefly one of recording motion on magnetic tape and playing it back for automatic programming of production and processes.

The tape stores a record of all machine operations necessary to produce a part. Reel can be run repetitively to produce duplicate parts with high accuracy. To change to a different part, you simply change the reel—just like changing from one vacation to another on the movie projector.

A Typical Job—Here's what happens when a part is machined under record-playback control.

A tape representing work to be done on a particular part is inserted in the control. Work is mounted in the machine, proper tool is inserted and all feeds are brought to correct starting position. A push-button starts the tape. Tool moves into the work, and machining continues until part is complete.

There are two basic operations: Recording the motion and playing it back.

Recording—In the first operation—recording—each of three feed motions is powered by an adjustable-speed direct-current motor. A selsyn (synchro) is coupled to each of these feed motors. It reports continuously angular position of motor by an electrical signal.

TABLE NO. 1

GE's analysis shows that advantages achieved and anticipated from record-playback control fall into two categories, faster production and lower production costs.

FASTER PRODUCTION

No templates to set up: Operators need not spend time in setting up templates, dogs, etc. Machine time can become nearly 100 per cent productive.

No gaging, blueprint checking: Machining progresses continuously without stops otherwise required for gaging or studying blueprints.

Machining sequence predetermined: Wasted operator motions are bypassed and the machine can work continuously if necessary. Sequence of operations, determined on the recording, is followed in an identical manner in the machining of each successive part.

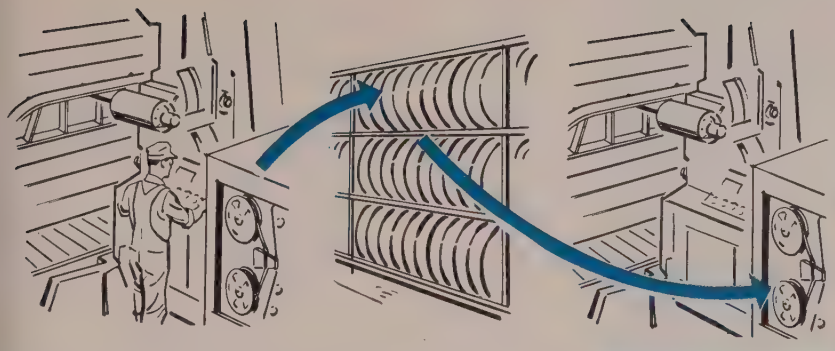
LOWER PRODUCTION COSTS

Eliminates operator error: Once the operation has been programmed and proved correct by making a part, each part made thereafter will be identical. Human error in miscalculating, carelessness or lack of skill is eliminated and waste material reduced.

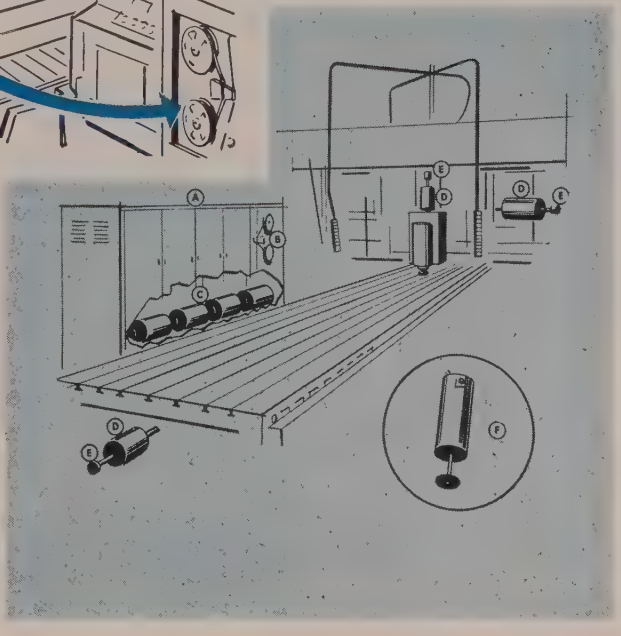
No templates to store and handle: Bulky, hard-to-handle templates are unnecessary. This makes it easier, quicker, more economical to convert to manufacture of different parts.

Permits smaller machines: Without templates, machines can be smaller, require less floor space.

Reduced inventory: Minimum setup time and costs permit making parts in small quantities as needed.



as is used to record machine motion. Then tape is played back to guide machine through same operations again



Drawing shows major components: (A) Floor mounted enclosures containing all control equipment, including record-playback control, tracer control and contactor control; (B) magnetic tape recorder; (C) ac motor-driven amplidyne generators that supply dc power for feed motors; (D) dc motors in any horsepower required by machine; (E) selsyns; (F) one or more tracing heads

Assume that an operator controls the machine manually to make the first part (this and other methods of making the recording are described in Table II). As he manipulates the controls, the selsyns send electrical signals to the moving magnetic tape. The tape thus memorizes the feed motions.

When the operator stops the machine to check his work or make adjustments, magnetic tape is also stopped. Only productive time is recorded—just as with a dictating machine. The operator can erase errors magnetically and repeat the operation.

In addition to feed motions, the tape also records any on-off operations the operator performs. These may include starting and stopping spindle motors, turning coolant on and off and other functions that normally would be initiated by pushbutton or limit switch. There are even sufficient channels in the tape to include voice instructions and to guide the operator if desired.

Playback—In its function of duplicating parts automatically, control's feed motors must turn exactly as they did during the recording. To accomplish this, the same selsyns are again put to work. Their output signals are compared continuously with those recorded on the tape, and electronic feed drives cause the selsyns and motors to rotate and stay in synchronism with the recorded motion. All recorded motions are duplicated and can be repeated thousands of times accurately.

Program Length — Length of tape determines length of the program. At the present time, this can be as long as one hour. Programs can be altered or built up by cutting and splicing.

Once a complete recording has been prepared and proved correct by making a part it will always produce the identical part.

TABLE NO. 2

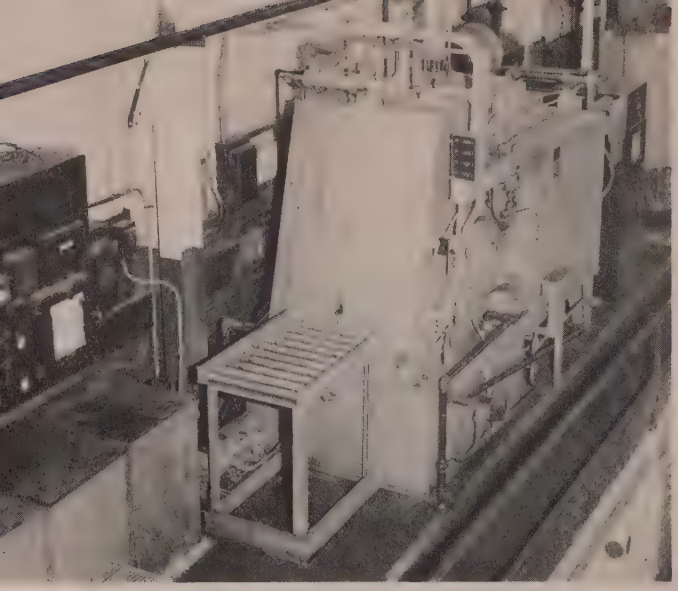
Machine operations are or will be recorded in four different ways for automatic production of complex parts. The first two, manual and by tracing, have recording done at the job site; the latter two, line drawing and by dimensions, are completed in engineering or planning departments, away from production area.

Manually—An operator machines the part while tape records machine motions and switching operations. This method may be used for less complex jobs, but for more detailed work best answer at present is tracing.

Tracing—A tracer head may be mounted in place of the tool and a sample part or template in place of the workpiece. Tape then records machine motions and switching operations as directed by tracer control and operator.

Line Drawing—Still in development stages is a system whereby control follows lines of a drawing directly, recording motions on tape without setting up the machine.

Dimensions—Future plans call for control which operates from the number information of a drawing. Digital information may be punched in paper tape which will be used to produce a magnetic tape suitable for playback operation.



This gas-fired, vertical, radiant-tube, automatic, batch-type, Lindberg furnace is adaptable to a variety of heat treating operations. The unit has a self-contained quench tank which includes automatic oil coolers and oil agitation

Number 2 in STEEL's

MODERN HEAT TREATING SERIES

By NORBERT K. KOEBEL
Director of Research
Lindberg Engineering Co.
Chicago

Fundamentals Of Heat Treatment—Part 1

CARBON IS KEY TO HARDNESS, STRENGTH

IN HEAT TREATING steel, carbon is boss.

If wire or strip steel with less than 0.15 per cent carbon is heated above 1600° F and water quenched, its physical properties (hardness and toughness) are not changed.

Steel with 0.25 to 0.30 per cent carbon heated above 1600° F and quenched becomes tough to bend.

When carbon content is above 0.50 per cent, steel becomes hard and brittle like glass if given this treatment.

Carbon content alone doesn't tell the whole story. Strength, hardness and many other important properties of steel also depend on the size and distribution of the carbide particles formed from the carbon in its structure.

Must Treat—True, carbon is the chief element that gives steel hardness and strength, but the carbon is of little or no value unless the steel is given a hardening treatment. Process of heating and quenching into brine, water or oil is hardening. Going back to our 0.50 per cent carbon steel in the previous example, if it had been heated above 1600° F and air cooled instead of quenching, there would have been little hardening.

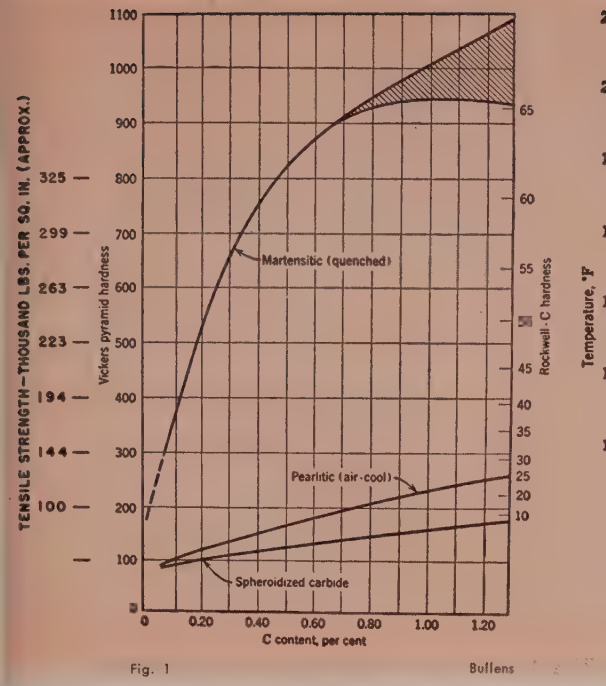
Carbon content gages the maximum hardness attainable in steel as is demonstrated in Figure 1. As hardness goes up, tensile strength also increases and wear resistance improves.

Tempering—Fully hardened steel in the as-quenched condition is usually too hard and brittle for most applications. To take out the brittleness the steel is tempered or drawn back.

Properties obtained by tempering depend on time and temperature. Higher the temperature, the softer the hardened steel becomes. Nuts, bolts and structural steel parts are tempered at 800 to 1200° F to give them high strength and toughness and to take away brittleness. Cutting tools and shears are tempered at only 400 to 450° F to give a high degree of hardness and wear resistance. Springs are tempered at 550 to 750° F to achieve spring-like properties.

Rules—Tempering for a short time at high temperature or a longer time at a lower temperature gives the same properties. Since a dense load (instead of one piece at a time) is tempered in commercial practice, it is desirable to use lower temperature with longer time. This aids control and gives uniform results.

Plain carbon and low alloy steels should be held at temperature at least one hour after it is reached throughout the load. Tool steels take a minimum of two hours at tempering temperature. Some high alloy tool steels, such as the hot work die steels, are so sluggish that two 10-hour tempering treatments are required. Steel is cooled



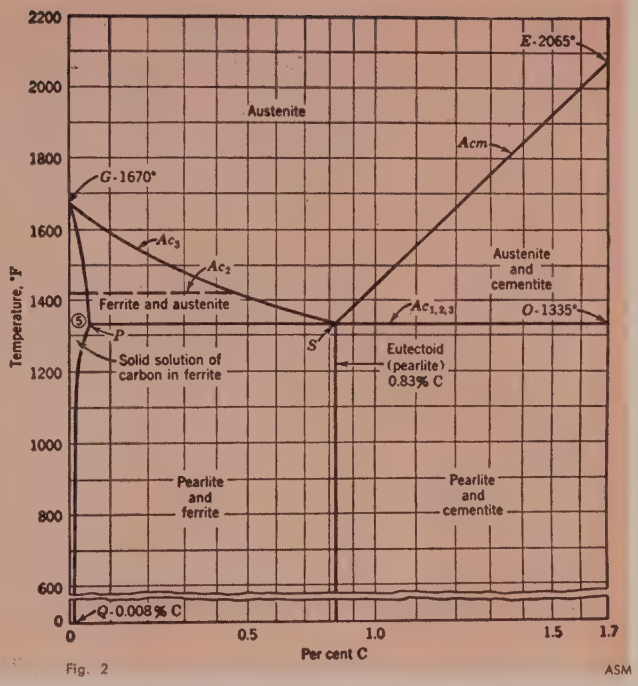


Fig. 1—Hardness of carbon steels in three structural conditions as a function of carbon content. Fig. 2—Iron-carbon equilibrium diagram

to room temperature between each operation.

Properties needed and type of steel determine tempering temperature. Time at temperature depends upon the size of load or size of the part and alloy content of the steel. Plain carbon and low alloy steels transform fast; high alloy steels are sluggish and need more time.

Normalizing — Process involves the heating of steel to about 1650° F (exact temperature depends on carbon content) and allowing it to cool in air. It relieves stresses after forging and homogenizes carbon and alloying elements. Hardening is uniform.

Normalizing also refines grain size giving a tougher steel, especially if it is subjected to high forging temperatures.

Annealing—Heating steel above its upper critical point (about 1400 to 1650° F, depending on carbon content) and furnace cooling is known as full annealing. This makes it soft and easier to machine or form without cracking.

Heating steel to 900 to 1200° F range, followed by air or furnace cooling, is stress annealing. It relieves stresses caused by forming, drawing or welding. Steel can be further worked without cracking or breaking.

If heating is just below the lower critical temperature (about 1275 to 1325° F for most steels), treatment is known as sub-critical annealing or spheroidizing. It makes some steels easier to machine.

Iron-Carbon System—Here we have the explanation for (Figure 2) changes in steel during heat treatment, plus a help in finding the proper hardening temperature for plain carbon steels.

Certain terms should be understood: Pure iron is called ferrite. A crystalline metal, it may exist in two different crystal structures. At room temperature and up to 1335-1414° F (depending upon carbon content), it is magnetic and has a body-centered cubic crystal structure.

Atoms in ferrite are arranged in the form of a cube, with an atom at each corner and one in the center. This (Figure 3) is alpha iron.

Rearrange—Above 1335° F, the iron atoms rearrange themselves into a face-centered cubic structure. Here, too, the atoms are in the form of a cube; now each face has an atom in its center (Figure 4).

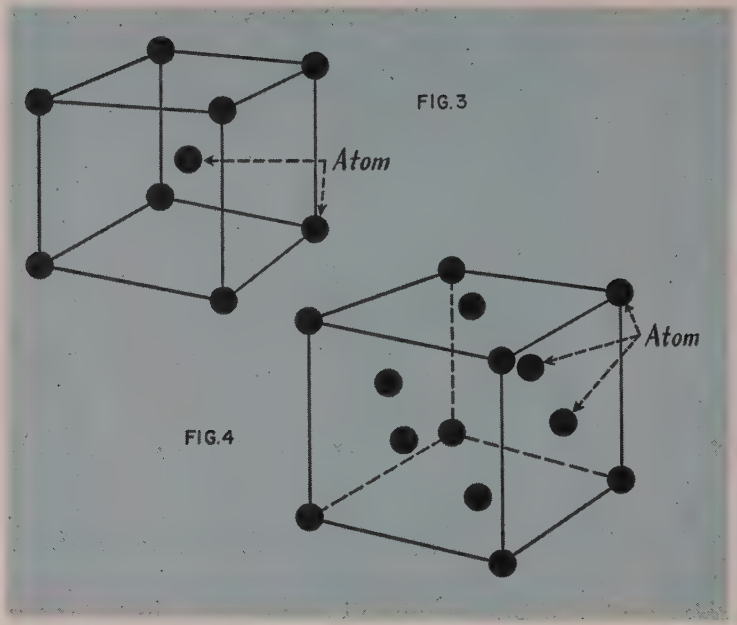
Since more atoms are required in a cell, all the atoms must rearrange themselves. Resulting compactness decreases volume. Steel contacts with this change in structure.

This form, called gamma iron or austenite, is nonmagnetic. It is a single phase (one constituent) microstructure. Although still a solid metal at elevated temperatures, austenite has a relatively high solvent power for carbon.

Plotted—Now, let's take a look at the iron-carbon diagram in Figure 2. It is essentially a map of the temperature at which phase changes take place in carbon steel on slow heating or cooling.

Under a microscope, the structure of a 0.5 per cent carbon steel at room temperature and up to about 1335° F has two constituents: Ferrite (pure iron) and pearlite. Pearlite is made up of layers of ferrite and cementite, a compound of three parts iron, one part carbon.

As the 0.5 per cent carbon steel is heated nothing happens until 1335° F is reached. Then the dark constituent, cementite, starts to disappear and a new constituent, austenite, appears. The steel is transforming from alpha iron



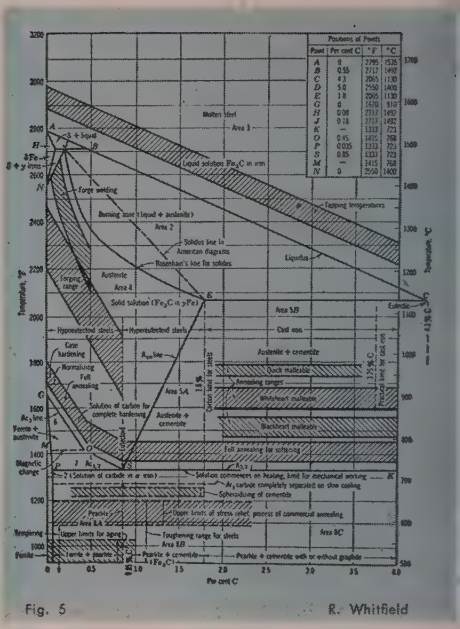


Fig. 3—Arrangement of atoms in a body-centered cubic cell. Fig. 4—Arrangement in face-centered cubic cell. Fig. 5—Various heat treating operations are superimposed on this iron-carbon equilibrium diagram

(body-center cubic structure) to the face-center cubic gamma iron. Above 1400° F (over the line GS), austenite is the only constituent.

Dissolves Carbon—Austenite is compatible with carbon. Carbon atoms slip in between the iron atoms and dissolve. So only one constituent can be seen under the microscope. In effect, gamma iron dissolves the compound iron carbide (cementite) just as water dissolves salt. Only difference is that gamma iron is a solid instead of a liquid. Resulting product is a solid solution.

Gamma iron, or austenite, is soft. Alpha iron, or the mixture of pearlite and ferrite, is soft. Then how does carbon influence hardening of steel?

This point is evident: Hardening of steel is not explained by the iron-carbon diagram. But it does show to what temperature steel of a given carbon content must be heated for quenching.

Hardening—When carbon steel is heated above the austenitizing temperature and rapidly quenched, an unstable condition is set up. Transformation does not take place at 1335° F to separate out the pearlite, as in slow cooling. Carbon stays in solution until a much lower temperature (about 450° F) is reached. Then, the iron-carbon compound comes rushing out, and atoms of carbon and iron rearrange themselves.

The iron transforms to alpha iron, as usual; but the iron-carbon compound comes out in a new tetragonal crystal form, martensite. Martensite has a needle-like structure. The crystals interlock with the iron crystals, causing the iron to become harder and tougher.

The greater the carbon content, the greater the number of hard martensitic needles formed, and the harder the steel. Higher carbon also increases the hardness of individual martensite needles. This is why higher carbon steels have more wear resistance.

Expanded—In Figure 4, various heat treating operations are superimposed on the equilibrium diagram. The proper heat treating temperature for carbon steel is indicated.

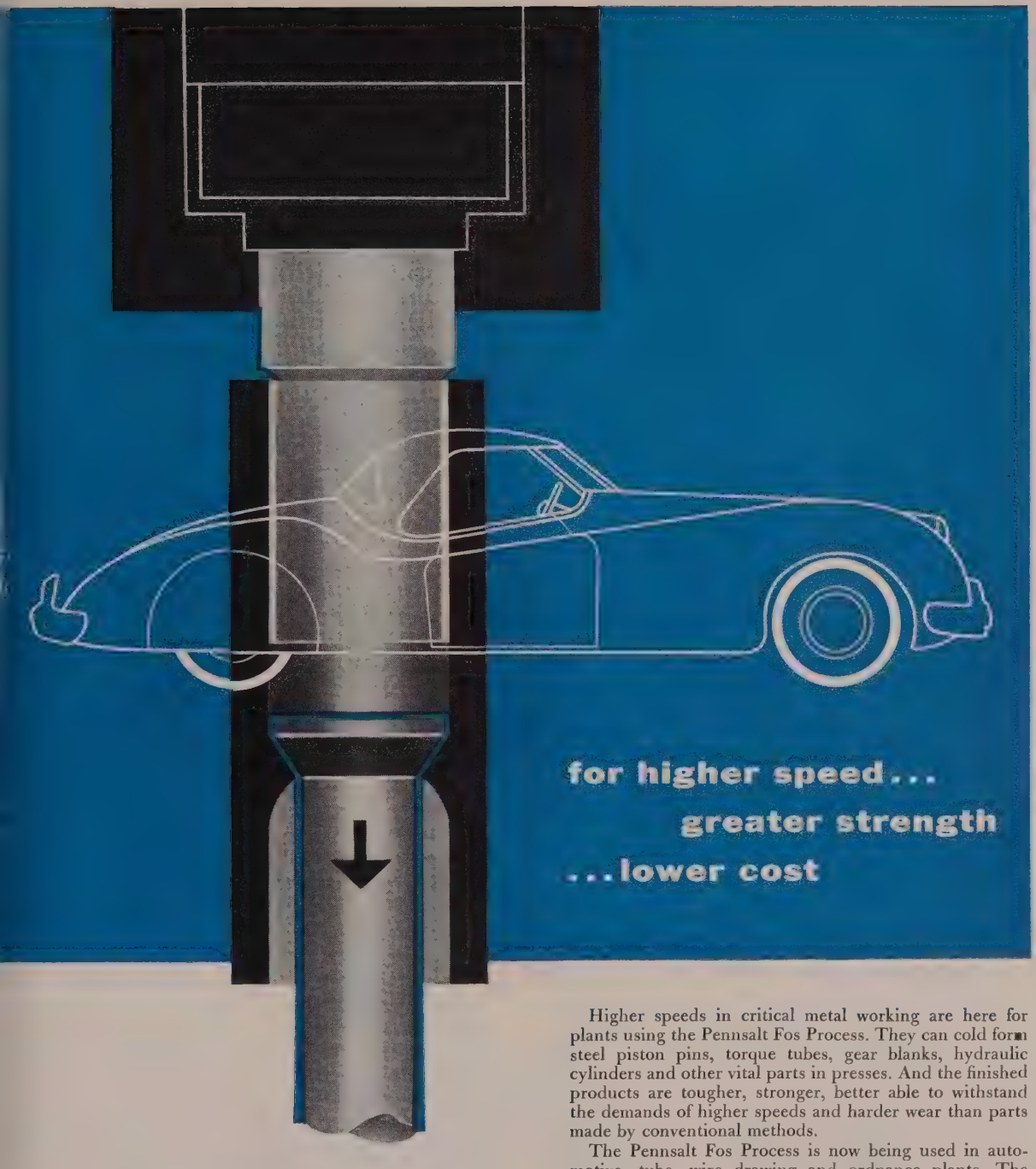
When steel is heated above the lines GO, OS or SK it becomes fully austenitic; if quenched rapidly from this temperature, it will fully harden. In general, heating should progress 50 to 100° F above these lines. On the other hand, it's not desirable to go more than this amount over the needed temperature. Growth of large crystals that interfere with toughness of steel is avoided.

For example, a 0.50 per cent carbon steel should be heated to 1500 to 1550° F; a 0.85 per cent carbon steel should be heated to only 1400 to 1450° F for full hardening. The transformation lines GO, OS and SK are known as the Ac3 lines, or upper critical points. Above them the iron and carbon completely transform to austenite.

Cooling Curve—Transformation points for carbon steel on heating and cooling are different. The cooling line is known as Ar3. Line on the equilibrium diagram is the average of the two.

Lines PS and SK are the average Ac1 and Ar1 lines. At this line, iron starts to transform into austenite and dissolves carbon, but the transformation is not complete until the Ac3 line is reached. If steel is heated between the Ac1 and Ac3 line and rapidly quenched, only partial hardening will result.

In part II, next week, Mr. Koebel will discuss fundamentals of heat treating alloy steels.



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Correlating Blast Furnace Operating Concepts

Generation, distribution, recovery and use of heat are the important factors which govern the proper coke combustion rate for efficient blast furnace operation

By CHARLES E. AGNEW
Consultant
Blast Furnace and
Sintering Plant Operations
Cleveland

PROBABLY no one will deny that the art of producing pig iron is a combination of practical and technical sciences. Although the practical science of blast furnace operation was well advanced long before technical science came into being, development of the art to its modern conception would not have been possible without the teachings which technical science alone could provide.

Definitions—Practical science of furnace operation might be described as knowledge of ways and means for controlling operating effects and for meeting operating requirements through visual observation of operating phenomena as indicated by the physical appearance of operating conditions and of the products produced (gas, slag, and iron) without having exact knowledge of the cause of the effects or exact measurements of the requirements.

The science involves the accurate timing of events in order to properly co-ordinate the assembly of raw materials with their flow through the furnace and the disposal of products discharged from the furnace. It is a means of operation based upon the judgment of the individual who is directing the operation.

Ability to exercise good judgment is developed from practical experience gained through close daily contact with the furnace, intelligent observation of changes in operating conditions as they occur, and the correct interpretation of the effects of the changes on the operating conditions.

There is no substitute for this practical experience, nor will any amount of formal education supply the natural intelligence which is required to profit from it.

Never Leads — Unquestionably,

COMPARISON OF OPERATING DATA

	South	North	Mathesius North	East
Gross tons iron per 24 hrs.....	324.7	709.0	,, 572.0	715.0
Materials Charged per 2240 lb of Iron				
Ore	4203.00	4220.00	4057.00	3450.00
Coke	2626.85	1942.00	1682.00	1350.00
Air	9627.88	7536.53	6673.00	4548.00
Stone	1226.85	740.00	795.00	300.00
Fe in ore mix, %.....	43.28	51.03	51.19	54.55
Ash in coke, %, (Natural).....	12.75	8.35	9.18	8.39
Fixed C in coke, %, (Natural)..	80.34	85.65	86.95	87.30
Materials Discharged per 2240 lb of Iron				
Slag	1786.47	984.00	1010.00	898.00
Flue dust	277.86	.....	89.00	90.00
Gas	13,244.89	10,551.14[1]	9359.00	6622.00
Working volume, cu ft.....	15,385	23,235	23,235[2]	21,550
Coke burned:				
Would have been, lb/24 hr[3]..	923,100	1,395,300	1,395,300	1,293,000
Actual, lb/24 hr	852,928	1,376,873	962,104	965,250
Actual, cu ft work. vol., lb.....	55.5	59.2	41.8	44.8
Fixed C burned:				
Actual, cu ft work. vol., lb..	44.6	50.7	36.3	39.1
Hearth area, sq ft.....	165.0	268.5	268.5	254.0
Gr ton iron/sq ft hearth area ...	1.97	2.64	2.13	2.81

[1] Lb air × 1.4 = lb gas (estimated).

[2] The two North operations were conducted at the same furnace. It is assumed there was no change in furnace lines and dimensions between the two periods of operation.

[3] Based on 60 lb coke per cu ft working volume.

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Modernizing Large Area Lighting

A fluorescent-mercury lighting installation replaces an incandescent system at Northrup Aircraft's Plant 3 in Hawthorne, Calif. The installation consists of 274 Westinghouse Electric Corp. 400-watt, J-HI fluorescent-mercury lamps. Designed to provide 35 foot-candles in service, the system uses ventilated high bay reflectors, thereby cutting down on dust accumulation. The lamps are spaced on 20 x 12½-foot centers, mounted at a height of 30 feet

as knowledge of the technical science increases, confidence in ability to direct the practical science increases; but it may be well said that although the technical science has become an indespensable guide for the practical science it is never the leader of it. Because of the many variables (not always predictable) which are encountered in direction of the practical science, particularly when natural raw materials are used, decisions affecting operating results must be made based upon operating conditions as they are, and not upon what they should be, or upon what they were expected to be. Because such decisions must take into consideration their immediate effects as well as their probable after effects 10 to 12 hours later they are tests of practical judgment and not of technical knowledge.

Helps Anticipate—Technical science of furnace operation might be described as knowledge of ways and means for anticipating the effects and requirements of operation. It provides means for measurement of thermal, chemical, and mechanical reactions which occur within the furnace. Through such measurement it serves as a guide for controlling the several reactions in orderly sequence—so long as no unforeseen occurrence disturbs the orderly sequence. It is a science based upon proved results of laboratory experiments in the fields of chemistry, physics, mineralogy and metallurgy, which have removed the elements of doubt or conjecture. It is a science which is applicable to constants, in contrast to the practical science which is applicable to variables.

Before and After—It may be well said that knowledge of technical science is of greater value before the raw materials are charged into the furnace than it is after they are charged because of the insight it gives regarding: Proper selection of raw materials for burdening the furnace; the various and variable effects of raw material properties upon operating requirements; performance regarding quality and quantity of products which may reasonably be expected from the raw materials.

However, after the materials have been charged into the furnace, knowledge of the practical science becomes paramount. After the products (gas, slag, iron) have been discharged from the furnace the benefits from technical science again come into play since it provides means for checking the efficiency with which the practical science has been applied.

All-Important Heat — No other phase of furnace operation has engendered more confusion of thought and controversy than the conditions which govern efficient generation, distribution, recovery, and use of heat. It may be well said much of the confusion could have been avoided if proper consideration had always been given to the basic nature of the two-stage principle of processing requirements, namely preparation of raw materials for smelting.

Using the two stage operating principle as a basis for study, in conjunction with the teachings which technical science affords, enables the practical science operator to successfully determine the cause of some effects he encounters in his operation which are too obscure to be accuratey identified with the limited facilities afforded by practical science alone.

Half Truths—Use of the same procedure also discloses the fallacious nature of many half-truths which have become a part of furnace practice lore, and to that extent the disclosures clarify some of the complex problems which confront the furnace operator. Controversial subjects and half truths are as follows:

1. Is the blowing rate a practice principle or a method for serving a principle?
2. What determines the optimum blowing rate?
3. How can productive capacity of a furnace of given dimensions be rated?
4. To what extent is furnace productive capacity influenced by reducibility of Fe from its several forms of existence?
5. Which has greater influence on furnace productive capacity and conversion economy—the weight of slag produced per unit of iron or the slag composition?

Sticklers — These questions, or some modification of them, have plagued industry personnel for generations. In the past, answers for them had to be based upon incomplete and inaccurate information because of the limitations of practical science for exact measurement of furnace reactions and effects therefrom. Now however, when analyzed in the light of the teachings of technical science, and the support given to such analysis

by actual furnace practice data, the erroneous nature of many long accepted beliefs readily becomes apparent.

Three comments frequently used as indicative of furnace productive capacity are;

1. The speed with which coke is burned.
2. The more wind you blow the more iron you make.
3. The speed with which stock can be put through the furnace.

Half Truths—Comment No. 2 is simply a modification of comment No. 1. To say the speed with which coke can be burned is determined by the blowing rate is to state an elementary and commonly known fact.

However, another commonly known fact is that any furnace can be overblown. The second fact immediately relegates comments Nos. 1 and 2 into the category of half-truths.

There is merit in the expression, "productive capacity of a furnace is determined by the speed with which coke can be burned, *consistent with efficient generation, distribution, recovery, and use of heat,*" but as commonly expressed in the half-truth form the statement is misleading.

Forced Draft — Advantage of forced draft for increasing production from iron ore processing was discovered over 500 years ago. Down through the centuries the advantage has been exploited in blast furnace operation through the trial and error methods of practical science operation, with only limited understanding of the principles which govern combustion, and virtually no understanding of conditions under which carbon combustion was effected and sustained within the furnace.

Technical science research first disclosed the principles which govern carbon combustion, and provided means for measuring the volume of heat (Btu) which can be produced from a unit weight of carbon and the temperature (Btu concentration) which can be attained through heat volume concentration. Technical science research[1] disclosed the principles which govern coke carbon combustion within the blast furnace and the limitation to heat volume generation which is created thereby

Blowing Rate—For approximately 75 years, development of blast furnace practice in the United States has largely been governed by operating problems which have been encountered with the use of ores from the Great Lakes region. Because these ores have contained a substantial amount of volatile matter (surface and combined) which had to be evolved in preparation for smelting, they have required delivery of a substantial volume of heat to the furnace shaft and, therefore, they have permitted, invited, and encouraged the use of a fast blowing rate.

Because of this Lake ore practice, the belief that a fast blowing rate is essential to maximum production for all furnace operations, and that it is a cardinal operating principle has become so strongly entrenched in the minds of many of the industry personnel, any expression of contrary opinion, or suggestion that the optimum blowing rate for each furnace operation is determined by the character of burden material used and not by furnace lines, is immediately and arbitrarily rejected.

Accepted Rule — The facts of Lake ore practice and operating theories based upon that practice are the factors usually cited in support of the firm belief in the need for a fast blowing rate. Also, the rule of burning a certain weight of coke per cubic foot of furnace working volume is frequently used as a guide for determining the optimum blowing rate. The source of the rule is embodied in the following quotations[2]:

"The capacity of a blast furnace in tons of pig iron per 24 hours depends upon the richness of the iron ore mix and the number of pounds of coke required per ton of the pig iron. The rule for calculating the capacity of a blast furnace of given dimensions, now generally accepted, is that adopted by the Southern Ohio Pig Iron & Coke Association in October, 1920, after two years of work by a special committee. The rule is as follows:

Regardless of grade of pig iron produced, blast furnaces of modern construction should burn about the same amount of fuel daily under same operating conditions. For each grade of pig iron the tonnage which can be produced will depend upon the quality of fuel used, yield of ore mixture and blast temperature. The tonnage of coke which can be burned in a unit of time has a certain ratio to the working volume of the furnace.

From figures prepared on a number of different sized furnaces, it has been found that with good practice 60 pounds of coke can be

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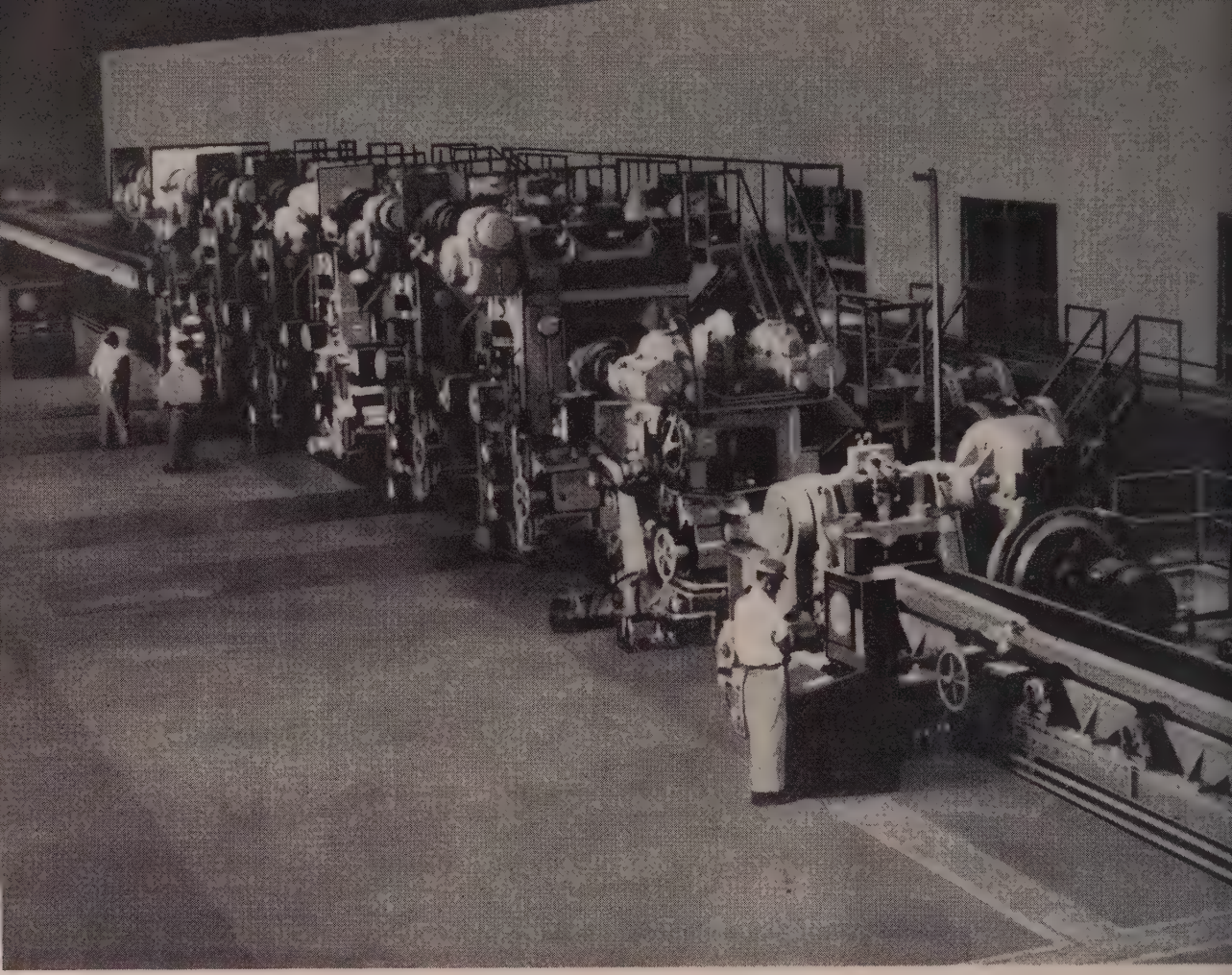

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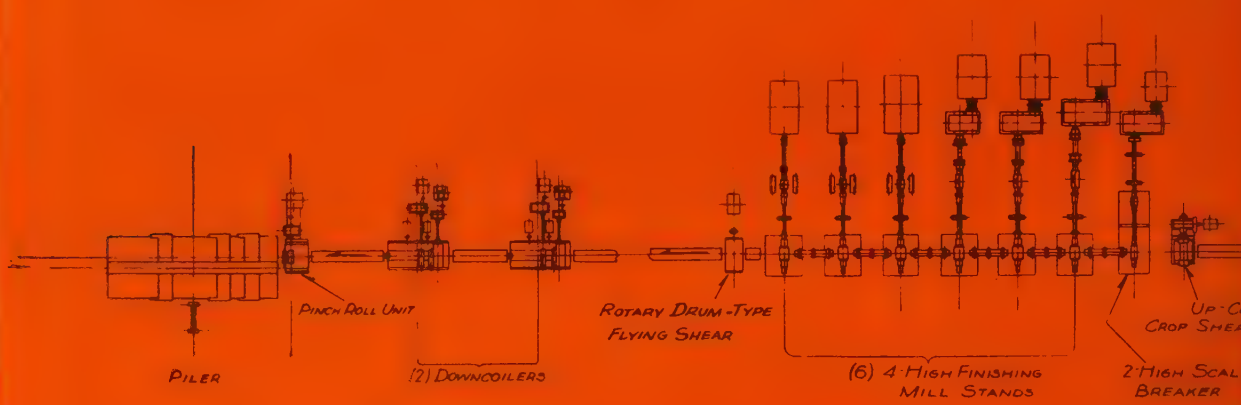

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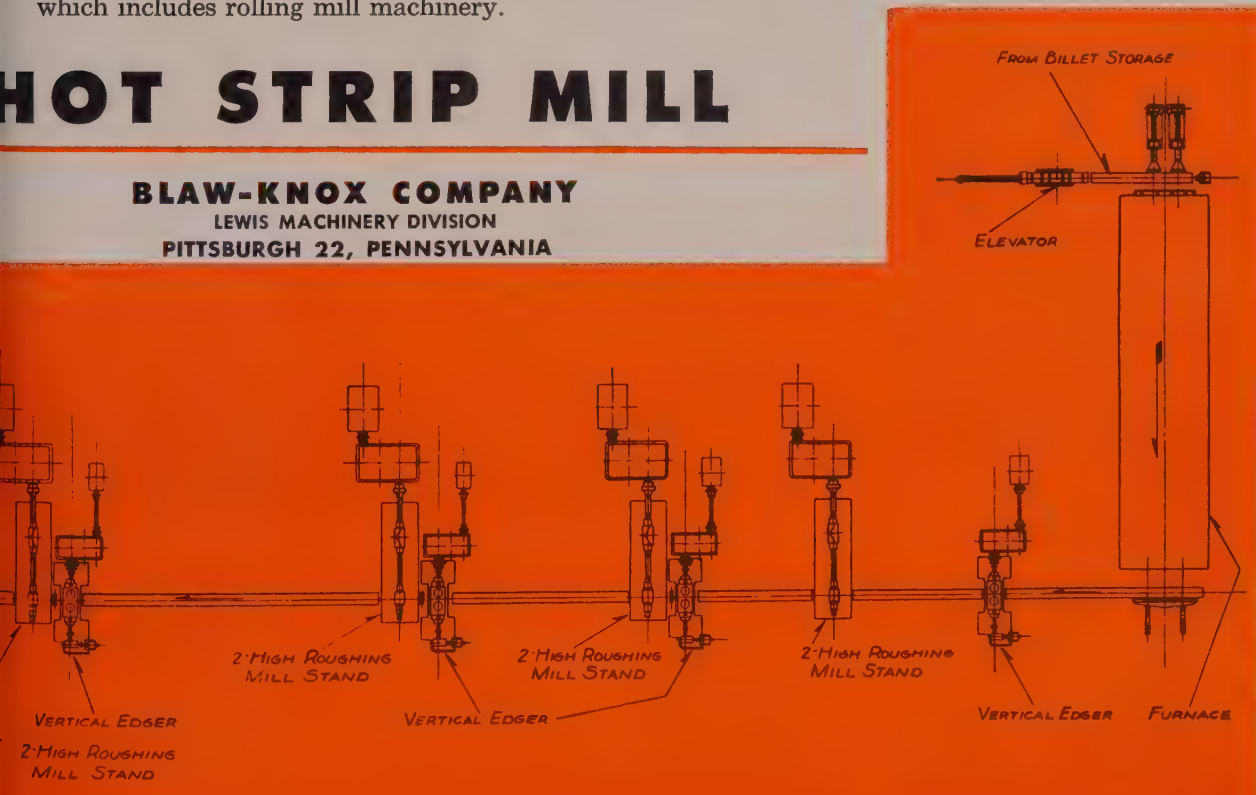


burnt each 24 hours per cubic foot of working voume. The working volume is taken as volume from center line of tuyeres to two feet below bell when closed.

Therefore, the capacity of a blast furnace must be expressed in terms of pounds of coke which can be burned per day. And in order to cover variations which exist from time to time in operation, it is necessary to adopt a base coke, a base theoretical yield ore mixture and a base hot blast temperature and then make allowances for variations as encountered.

The analysis of the "base" coke referred to is as follows:

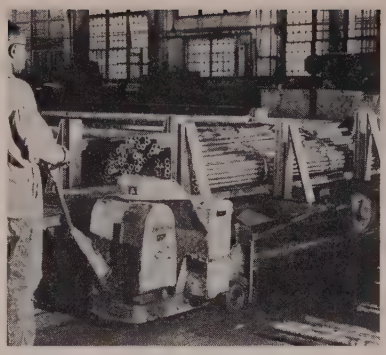
Element	Per Cent
Fixed carbon	89.00
Sulphur	1.00
Ash	9.00 to 10.00
Volatile	1.00 to 2.00

The structure of the coke is tough, but not dense or fragile, and free from braise.

A Qualifier — If the foregoing rule for burning coke is analyzed, it becomes apparent that the outstanding item if importance to its value as a gage of furnace productive capacity is expressed in the last four words of the first sentence of the first paragraph, namely, "under same operating conditons."

Since that qualifying statement appears in the first sentence of the rule it is reasonable to believe the formulating committee intended it to be a premise upon which the value of subsequent statements should be based. However, the item of the rule which is usually quoted is the one expressed in the second paragraph, namely, "Sixty pounds of coke can be burnt each 24 hours per cubic foot of working volume." Usually the item is quoted with total disregard for both the initial qualifying statement of the first sentence and the additional qualifying facts and requirements of furnace practice which the committee cited in the third paragraph as being the factors governing successful application of the rule as a gage of furnace productive capacity.

Easy To See—Effects which different "operating conditions" have on the practical value of the rule, and the importance of the "qualifications" which the formulating committee recognized and cited, can be clearly illustrated with resort to the teachings of technical science and with comparison of practice data from actual furnace



Moving Extruded Pipe

To bridge the gap between bays served by cranes at American Brass Co.'s Buffalo plant, an Automatic Transtractor is used to power a 19-foot-long trailer mounted on rails. Manufactured by Automatic Transportation Co., the Transtractor is coupled to the trailer and moves extruded pipe stock weighing up to 10 tons.

operation where the burden materials vary widely in chemical and physical properties. Such a comparison was made by the writer in a recent series of articles.[3]

When the data on the table is analyzed in conjunction with the complete data of the comparison it readily becomes apparent that no logical connection can be established between cubic feet of furnace working volume, pounds of coke burned, and furnace productive capacity, when there is wide range in the properties of burden materials. The statement implies no criticism of the committee which formulated the rule.

No Data Available—At the time of formulation (1920) the exhaustive research,[4] which recorded the quantitative measurements of blast furnace reactions, had not yet been made. In 1920 there was no blast furnace operation in the world similar to the East operation, where fully beneficiated ore and other volatile free materials constituted the furnace burden.

Natural ores from the Great Lakes region were better balanced chemically in 1920 than now, and, therefore, the furnace practice data upon which the committee must have based their deductions were probably more uniform than similar data would be now with the use of natural Lake ores. Even though some Lake ores retain the same names as in the past they are not the same in chemical and physical properties as they were 34 years ago.

Important Qualifiers—The wording of the rule clearly expresses the opinion of the committee members regarding the importance of the "qualifying" statements which they incorporated in it. Actual measurement data for further clarification of their opinions were not available to them.

Because of the truths which have been cited it is reasonable to say the pounds of coke burned per cubic foot of furnace working volume per 24 hours cannot be successfully used as an indicator of furnace productive capacity, or as an accurate guide for establishing a blowing rate. In like manner, as indicated by data in the table, attempts to gage furnace productive capacity on the basis of square feet of hearth area are not reliable.

Heat Conditions Govern—Generation, distribution, recovery, and use of heat, as determined by the processing requirements of raw materials used, may be said to be the principles which govern the proper coke combustion rate for efficient blast furnace operation. The principle as expressed applies to all of the four operations presented in the table.

Nature of the work performed in the respective combined divisions of work is the same in each of the four operations—only the amounts of heat volume (Btu) required for the respective divisions vary. To satisfy these various requirements in their proper sequence, heat volume must be distributed to the respective divisions of work in proper proportions in order for the operation to function effectively, efficiently, and economically.

Thermal Requirements — Since the blowing rate is the agent for both generation and distribution of heat it must be based upon the thermal requirements of the other raw materials which are used, with due regard for the mechanical effects created by the disposal of the gas column through the stock column. Attempts to establish a blowing rate based upon furnace lines, or upon a given weight of coke to be burned, and then force the performance of the necessary thermal work to conform to it, is a violation of the principle cited. The data

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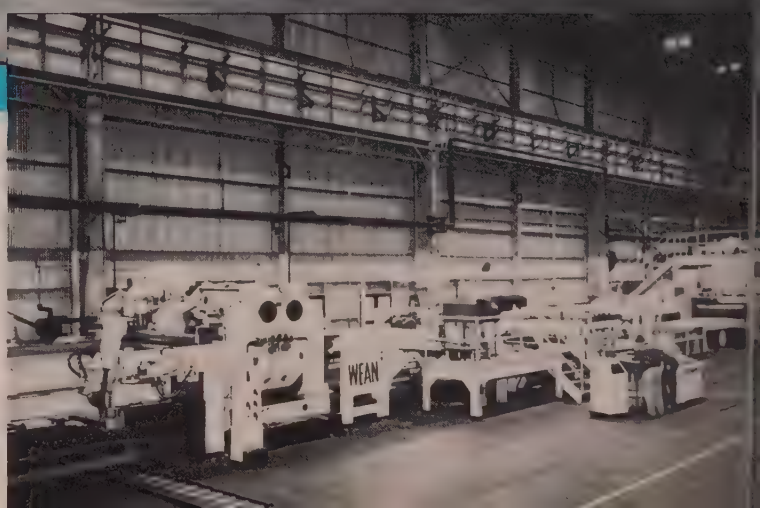
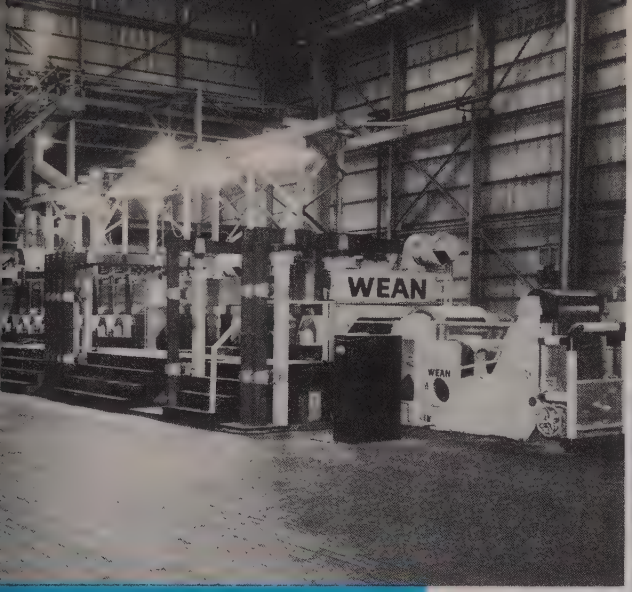
Wean 74"-wide continuous high-speed STRIP PICKLER with temper mill.

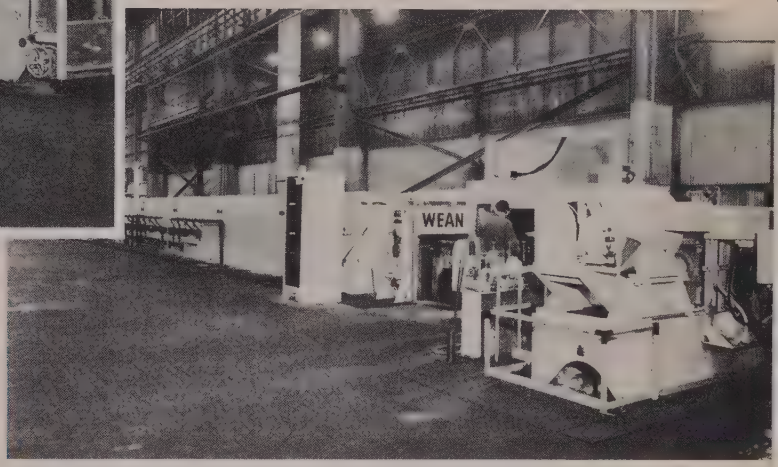


Wean 74" HOT STRIP SHEARING and PROCESSING LINE including following operations: process uncoiling, side trimming or slitting, temper rolling, coiling or cutting-to-length, leveling and classifying and piling.



Wean-Ferrostan Electrolytic Tinning Line.

Wean 48" Electrolytic Cleaning Line for sheet strip and tin plate.



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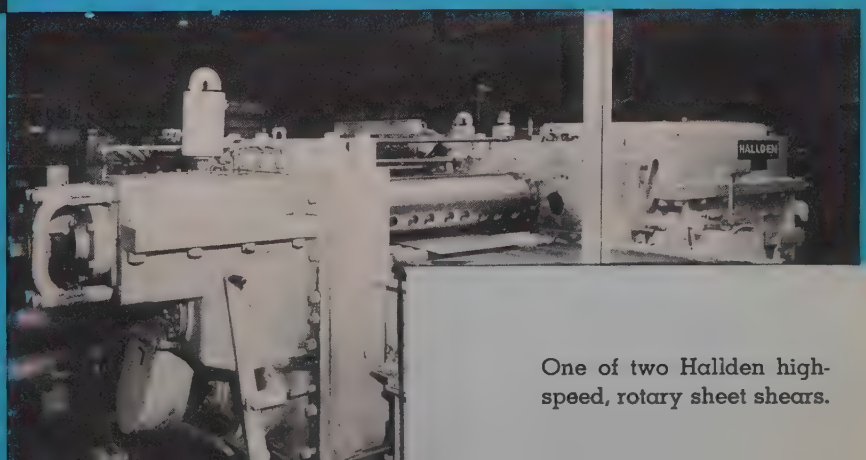
Concentrating on the production of strip sheets and tin plate at faster speeds, while actually improving quality, U. S. Steel selected the Wean Engineering Company, Inc., to design and build Pickle Line Equipment, a Hot Strip Shearing and Processing Line, an Electrolytic Cleaning Line, Electrolytic Tinning Line Processing Equipment and the Cold Strip Flying Shears (Hallden) pictured on these pages.



One of two Hallden high-speed, rotary sheet shears.

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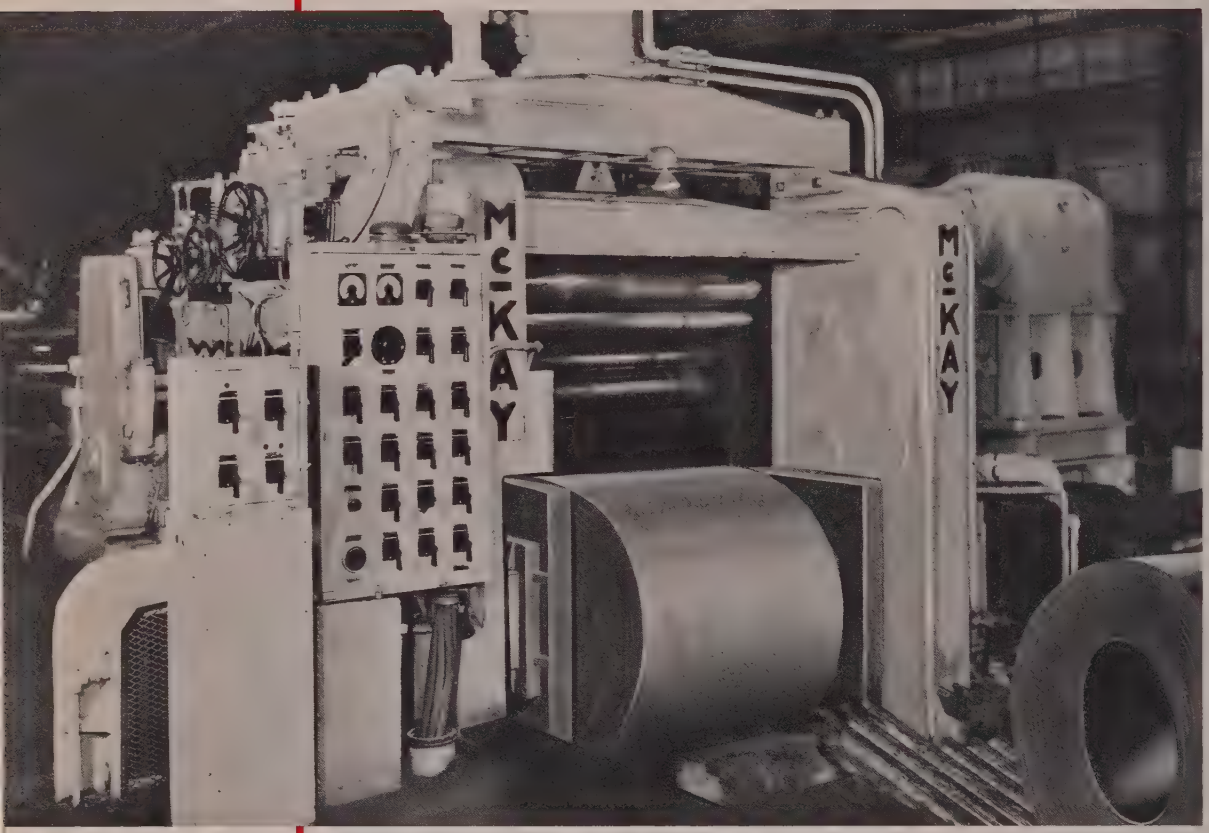
ENGINEERS AND DESIGNERS OF EQUIPMENT FOR THE AUTOMOTIVE, FABRICATING AND STEEL INDUSTRIES

The McKay Heavy Duty Machine shown below permits uncoiling hot rolled material up to 1500 ft. per minute.



Building a plant for the future requires equipment that anticipates future demands.

When designing "The Fairless Works" — the U. S. Steel Corporation insisted on equipment that would satisfy future requirements.

For this "mill of tomorrow" the McKay Machine Company has supplied the processing uncoiler (illustrated above) and the upcoiler in the Wean 74" Continuous Strip Pickle Line.

The Wean 74" Strip Shearing and Processing Line also includes a McKay processing uncoiler and roller leveler.

We are proud of the faith displayed by U. S. Steel in their selection of McKay Equipment for this most modern steel mill.

THE McKAY MACHINE COMPANY
YOUNGSTOWN, OHIO

he in U.S.A.

of the table may be used for illustration.

The ores, stone, and coke of the two North operations were virtually the same in chemical and physical properties—only the blowing rates differed to any extent. As indicated, with 12.94 per cent increase in the blowing rate of the North operation over the Mathesius operation, iron production was increased 23.95 per cent. However, the increase was paid for with a loss of conversion economy, as indicated by the 15.45 per cent increase in the fuel rate and the 4.01 percent increase in the weight of ore used to produce an equal weight of iron. The recorded practice data of the North operation (Technical Paper No. 442) does not show the weight of flue dust produced, but the 163-pound increase in weight of ore used to produce an equal weight of iron as the Mathesius operation indicates a substantial increase in flue dust production compared to the recorded production from the Mathesius operation.

Principle or Method — Data of the two North operations indicate conditions where principle is sacrificed to method. It is not intended to imply that sacrifice of principle is always wrong, because commercial conditions may at times justify it, but, to the student of furnace practice, there should always be clear understanding of the nature of the sacrifice. Specifically, thermal requirements for burden materials used at the two North operations were virtually the same. Both operations were deficient in raw material preparation capacity in relation to smelting capacity.

With an increase in the blowing rate, more heat was delivered to the burden material preparation zone and preparation of more material for smelting was effected. Therefore, the difference in blowing rates between the two operations indicates a permissible range of blowing with the class of burden materials used so long as there is justification for sacrifice in conversion economy. But the extent of the sacrifice, as measured in the fuel rate and flue dust loss, also indicates there is an economic limit to such sacrifice.

For Example — East operation (see table) was deficient in smelting capacity in relation to burden material preparation capacity. Therefore, any increase in the blowing rate would have increased drainage of heat from the smelting operation by gas rising to the preparation operation. Consequently, the deficiency in smelting capacity would have been increased while the over-supply of heat to the preparation operation would have created fusion in a zone of the furnace where fusion is not needed or desired.

South (see table) burden materials contained a substantial amount of carbonate (CO_2). Because the elimination of CO_2 from burden materials consumes a large amount of heat the South operation permitted the use of a faster blowing rate than the North operation without the danger of creating fusion in the zone of burden material preparation.

Not A Practice—Further proof that the fast blowing rate is not a practice principle but a method for serving a principle, and is determined, permitted, and limited by the character of burden materials is clearly illustrated in the comparison of the North with South and East operations. South burden materials contained less iron and more volatile matter than the North materials. Heat volume requirement for the elimination of the volatile matter was therefore greater than for North and so permitted a blowing rate substantially greater (27.75 per cent) than the North. However, South burned less coke per cubic foot of furnace working volume and produced less iron per square foot of hearth area.

East burden materials contained more iron and less volatile matter (fluxing stone only) than South, or either of the two North operations; had a blowing rate only 47.25 per cent and 78.30 per cent, respectively, of South and 442 North; and burned less coke per cu ft of furnace working volume than either of the fast blowing rate furnaces but produced more iron per square foot of hearth area.

Obviously, if the blowing rates of South and East had been based upon the 60-pound fuel consumption per cubic foot of furnace working volume, heat volume generation and distribution of it to the respective divisions of work would have been out of proportion to the thermal requirements of the respective divisions and the burden materials used. Thermal requirements and effects of the four operations of the table were analyzed in detail in a recent series of articles.[3]

(To be continued)

1. Technical paper No. 391, by S. P. Kinney, P. H. Royster and T. L. Joseph, United States Bureau of Mines, Washington.
2. "Blast Furnace Practice," 1938, by Ralph H. Sweetser.
3. "Blast Furnace Practice," by Charles E. Agnew—a series of 19 articles presented in STEEL, 1951-52 and reprinted in a 62-page booklet.
4. Technical papers Nos. 391, 397 and 442, by S. P. Kinney, P. H. Royster and T. L. Joseph, United States Bureau of Mines, Washington.

Protects Tank Throat

Corrosion and abrasion are abated by using bonded rubber linings. Applicable to all shapes and sizes of tanks, it will not slough off or crack or buckle under alternate drying and wetting. Here the coating is being applied to a salt brine tank before vulcanization at Goodyear Tire & Rubber Co., Akron

Magnesia Refractory

An all-crystalline magnesia refractory of particular interest to the metalworking field, has been developed by Electro Refractories & Abrasives Corp. It will be a desirable tool where resistance to basic slags of metals is requisite and the lead industry in particular will find it useful in smelting and purifying operations.

The magnesia refractory is reportedly 97 per cent pure. Nearly all impurities are inert, being imprisoned in the crystal structure. Magnesia is one of the most refractory materials known and is used at temperatures up to 3600° F. The refractory also has excellent spall-resistance.

This is the second in the series of five articles on titanium by Mr. Bradford. First, published May 10 in STEEL, dealt with "commercially" useful properties and availability. In succeeding issues, he will discuss: Hot Working Titanium, Heat Treatment and Metallography of Titanium Alloys, and Forming Titanium.

GRINDING TIPS

USE PROPER WHEELS	For example, 32A60-K8VBE aluminum-oxide wheel, 60 grit, vitrified-bond type
USE EFFECTIVE COOLANTS	For example, 5 to 10 per cent solution of sodium nitrite at 2000 to 2500 sfm
USE CORRECT FEEDS	For example, unit crossfeed of 0.025 inch, downfeed of 0.001 for 25 micro-inch finish

How to Grind Titanium

Once a headache, producers and wheel manufacturers have licked most of the problems. Grinding of commercially-pure grades is routine. Alloys are like other high-strength metals

By C. I. BRADFORD
Vice President and Director of Operations
Rem-Cru Titanium Inc.
Midland, Pa.

GRINDING titanium sets up high, localized temperatures at point of wheel contact, and the metal apparently combines chemically with wheel materials.

Corrective steps call for three inter-related practices: Selection of proper wheels, use of effective coolants and correct wheel feeds. An understanding of the science of grinding also is important.

Background—Grinding has been likened to machining with a myriad of little, single point cutting tools. If the operation is successful, each little grain of abrasive material in the contact area of the wheel must remove a tiny chip from the material being ground. Since resharpening is impractical, the grain must break away, leaving a fresh, sharp surface to cut at the wheel's next revolution.

If breaking-away is not fast enough, the wheel becomes glazed or loaded, and the relatively smooth surface burnishes the metal surface. This causes a sudden, rapid rise in temperature that results in burning and cracking.

If the wheel surface is broke away too rapidly (by the met being ground or by frequent whe dressing), ratio of wheel wear t metal removal increases.

Experience—Early attempts t grind titanium, particularly hig carbon or high-oxygen alloy were disappointing. In fact, grin ing was almost written off as fabricating technique.

Certain alloys were prone grinding cracks and distortion b cause of notch sensitivity, hi stresses and poor dissipation

Swing grinders are being used here to remove scale and surface imperfections prior to final slabbing

Grinding also is used in the manufacture of sheet. In this case, C-110M is being surface conditioned

heat. Rate of wheel wear (in terms of cost and accuracy of form) was almost prohibitive. Some persons reported losing 1 to 2 pounds of wheel for each pound of metal removed—in most cases, general purpose grinding wheels and techniques were being used.

Grinding wheel people promptly attacked the problem, and Rem-Cru kept grindability and notch sensitivity in mind when developing its alloys. Now grinding of A-55 and A-70 is a routine proposition. Sheet alloy C-110M is surface-conditioned in slab form without difficulty during production. C-130AM, the standard bar and forging alloy, presents no problems other than would be expected from a material with a tensile strength of 150,000 psi.

Recommendations — A silicon carbide wheel, such as 37C60-K5V, can be used for surface grinding, but satisfactory results are obtained only at speeds of about 5000 to 6000 sfm and with grinding oils. At these speeds, a fire hazard is created when intense sparks come into contact with the oil mist.

An aluminum oxide wheel, such as 32A60-K8VBE, gives highly satisfactory results in surface grinding. The wheel is a fairly soft, 60-grit, vitrified-bond type. It should be used with a 5 to 10 per cent solution of sodium nitrite as coolant and at a speed of about 2000 to 2500 sfm. Finishes of 25 micro-inches or better have been obtained with a unit crossfeed of 0.025 and a downfeed of 0.001 inch.

Property Factor—Of course, it is easier to grind a commercially-pure titanium than it is a high-strength alloy. But grinding speed has a pronounced effect.

For a given wheel and coolant there seems to be an optimum speed that produces much higher grinding ratios than a speed a few hundred feet per minute faster or slower.

Time required to determine this optimum speed under a given set of conditions is effort well spent, particularly for long-run jobs.

Coolants—It has been said that water as a coolant is about as effective as no coolant at all. Some data, in fact, show a decrease in grinding ratio in water, as compared to air.

Here are some grinding oils that have given good results but may present a fire hazard at high speeds:

Cutmax 206—product of E. F. Houghton & Company.

S/V Sultran BZ—product of Socony-Vacuum Oil Co. Inc.

Super Kool 81X—product of D. A. Stuart Oil Co. Ltd.

Vantrol No. 5363—product of Van Straaten Chemical Co.

Also satisfactory are water-soluble oils, such as:

Hocut—product of Houghton Company.

International Compound No. 152R—product of International Chemical Co.

Rust-Lick S-M-50 or L-B-52—product of Production Specialties, Inc.

PD 940-B—product of Socony-Vacuum Oil Co. Inc.

Vantrol No. 630—product of Van Straaten Co.

One investigator reports a good deal of promise for the following nitrite-amine-type, rust inhibitor solutions, such as:

Houghto-Grind 50—product of Houghton Co.

International Compound No. 47LS—product of International Chemical.

Rust-Lick B—product of Production Specialties.

S/V Rust Inhibitor A—product of Socony-Vacuum.

Economy Liquid No. 1500—product of White & Babley Co.

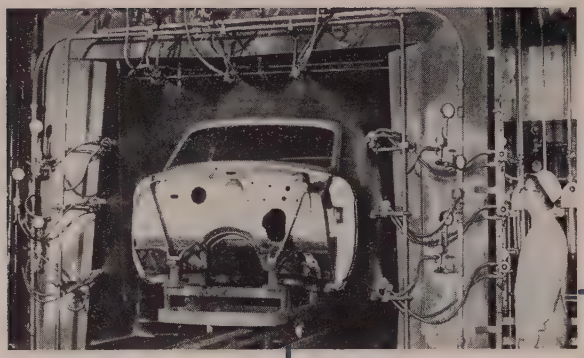
Work with barium nitrate solutions indicates even better coolants will be found.

Internal Grinding—For this normally troublesome operation, Cincinnati Milling Machine Co. has developed a special wheel—Cincinnati No. 1140. When it is used at 4000 fpm with Cimcool Titan coolant, excellent production results are reported.

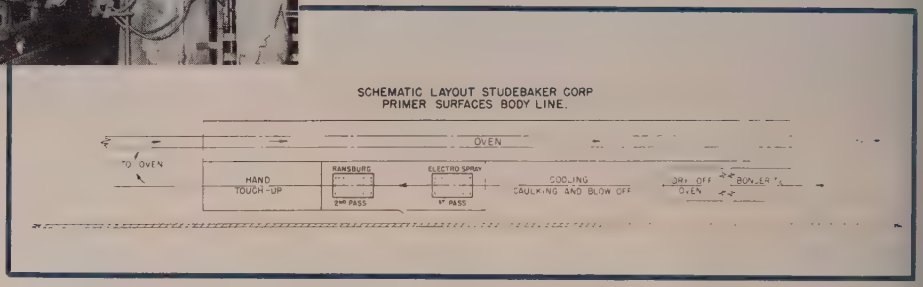
For external and cylindrical grinding, Cincinnati No. 1182 wheels have been used at about the same speeds with the same coolant.

Summary — Recognition of optimum grinding wheel speeds has been one of the important advances. It is significant to note that speeds are usually below those for other metals.

Wheel selection also has been important, but proper coolant probably has been the most critical. Indications are that the addition of proper chemical compounds to the coolant will inhibit the reaction between titanium and the grinding wheel. Benefits will include longer wheel life and improved surface finishes.



Nine spray guns are set up at entrance and exit of each booth. Dollies trip switches to operate guns



You Can't Oversell Undercoats

Company says it is now able to produce more bodies per hour and give them a heavier primer film by using the electrostatic spray process. Net saving is $1.90 per body

By JULIUS GAUSS
Retired Head of Paint Laboratories
Studebaker Corp.
South Bend, Ind.

THE AVERAGE car buyer doesn't give a hoot about the prime coating used by the manufacturer. He, or she, is sold on the bright, shiny finish. It's taken for granted it will hold up under all weather and climatic conditions.

Studebaker, like other car manufacturers, has given plenty of thought to the all important first coat. If it's uniform and enduring, it goes a long way toward providing desired exposure resistance.

Plan—In 1952 we decided to improve our finish by using a heavier primer film and produce more bodies per hour. But facilities were inadequate.

Both requirements were filled with Ransburg electrostatic spray equipment. Process involves putting a negative charge on the finish, so it is attracted to the surfaces being coated.

Net saving was $1.90 per body in paint and direct labor. System applies a 2¼-mil film thickness at a cost of $2.16 for paint, $1.19 for labor. To apply same coat by handspray, it would cost $3.12 for paint, $2.13 for labor. In addition, one surfacer oven was eliminated.

For short production periods in 1953, it was possible to paint up to 107 bodies an hour. Limit of the former process was 80 bodies.

The Line—Nine spray guns—3 on each side of the line and 3 overhead—are set up at the entrance and exit of each booth, with 30 feet of flash-off space between them. Each body is mounted on a dolly advanced by a drag chain conveyor—it's 350 feet long and operates at 24 fpm. Dollies operate switches that turn guns on and off automatically. They operate only while bodies are in the spray.

Guns are adjusted to spray at 15 to 18 psi atomizing pressure and 1½ to 2½ psi fluid pressure. The primer surfacer, a DuPont, oil-base type, is reduced to 13-second viscosity—measured by a No. 4 Ford cup.

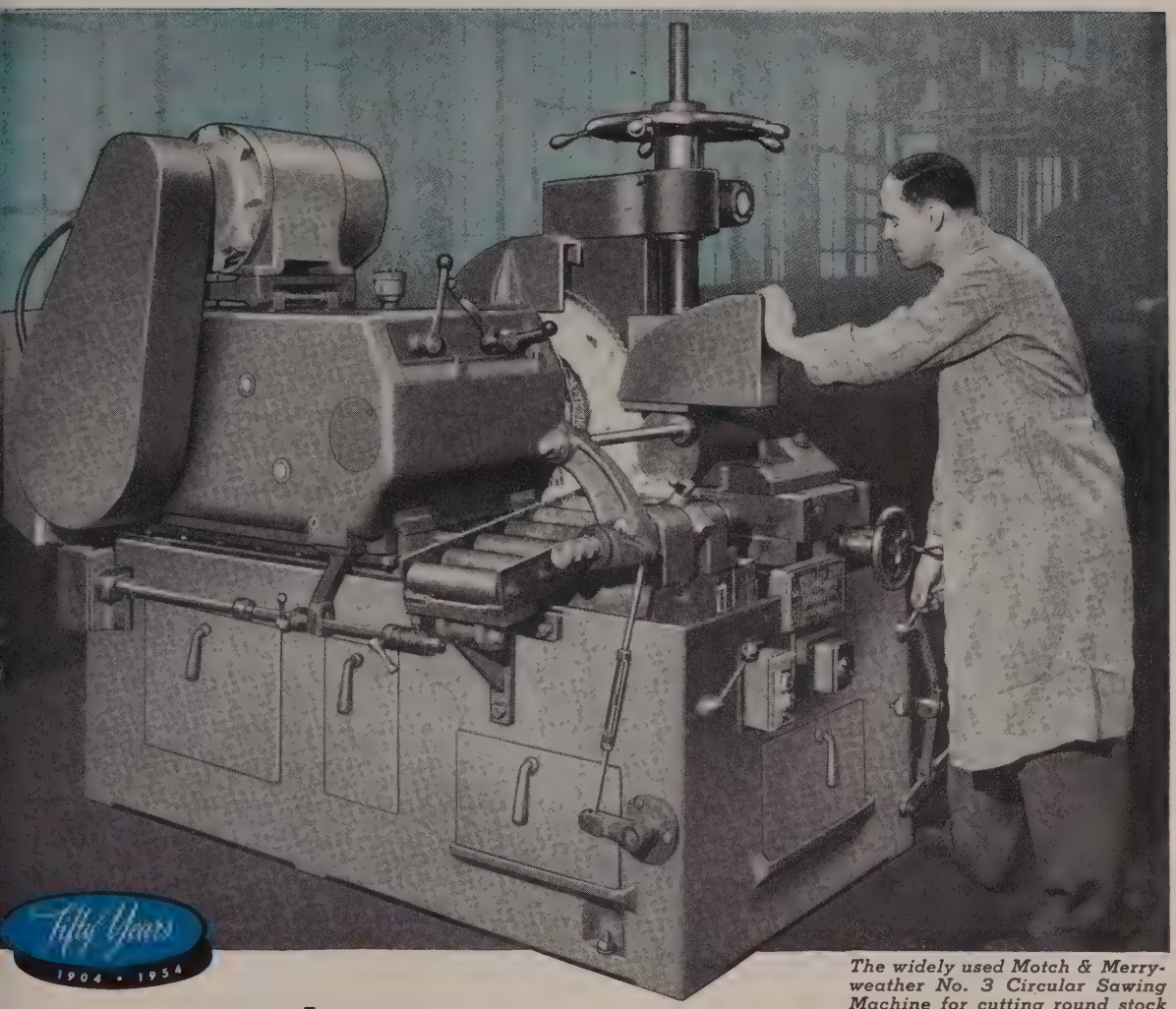
Windup — After bodies pass through the second electro-spray booth, they go into the 60-foot booth, where handspray men paint the interior, door jambs and re-inforce the rear deck.

Following handspray, bodies go into a gas-fired, convection-type oven, where the primer surfacer is baked on for 1 hour at 280° F. Then the units go to wet sanding, where the primer is rubbed down in preparation for applying the finish coat.

The uniformity and thickness of the primer surfacer is important because water sanding removes up to 1.5 mils. Additional thickness (2¼ to 3-mil film) permits sanding without leaving bare spots.

Owing to the more uniform and heavier coating, six less sanders and four less puttymen are needed.

Successful—Don Whitmore, assistant plant engineer, says: "We are producing a better prime coat than ever before. Field complaints for paint failures due to undercoat have been substantially eliminated."



The widely used Motch & Merryweather No. 3 Circular Sawing Machine for cutting round stock up to 10" diameter.

remember...

It's the Cost per Cut that Counts!

SECURE HIGH PRODUCTION AT LOW COST

For every ferrous or non-ferrous metal, for any shape or size, for production or short runs, — study *new high* records made by Motch & Merryweather Circular Sawing Machines employing the Triple-Chip Method and available in:

A complete size range for cutting stock up to 43" diameter.

THE MOTCH & MERRYWEATHER MACHINERY CO.

CLEVELAND 13, OHIO

Builders also of Production Milling, Vertical Turning, Automatic and Special Machines

Alliance CAR DUMPER

Rugged

25 YEARS OF SERVICE AND STILL GOING STRONG

● This traveling car dumper at the Weirton, West Virginia, plant of the National Steel Corporation was built by Alliance in 1927. It has handled every carload of ore delivered to the Weirton plant since then. Designed to handle single cars, it dumps ore constantly at the rate of twenty-six cars per hour. Cars are spotted on the dumper by a locomotive.

The record of rugged dependability and economical service established at Weirton is typical of Alliance performance everywhere. Building safer, stronger and better machinery is the Alliance aim. It is our goal to make the name Alliance synonomous with quality, dependability and service.

Contact us for your heavy equipment.

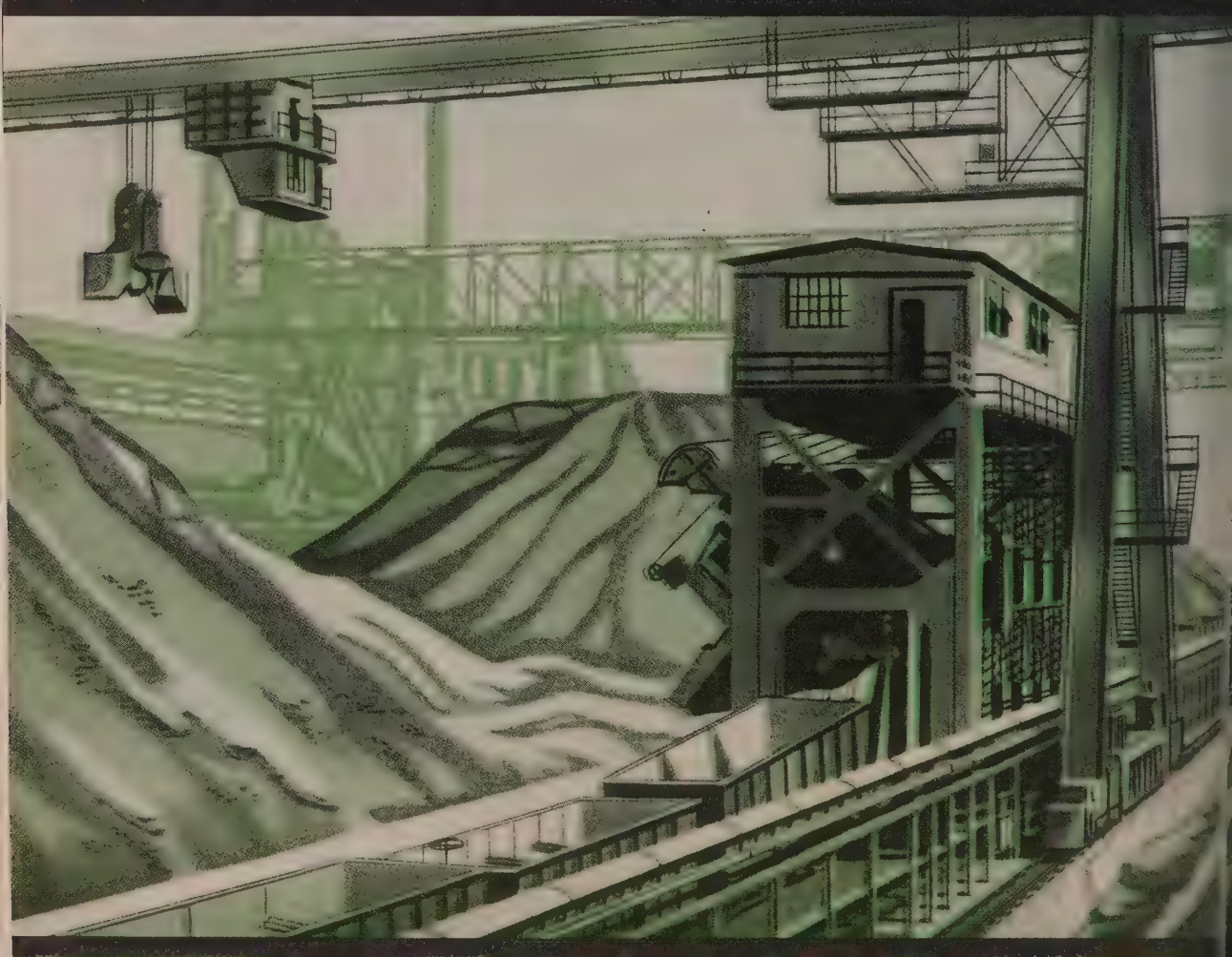
Give Us The Runway And We'll Lift The World

THE *Alliance* MACHINE COMPANY

Main Office: Alliance, Ohio *Founded 1901*

LADLE CRANES · GANTRY CRANES · FORGING MANIPULATORS · SOAKING PIT CRANES
STRIPPER CRANES · SLAB AND BILLET CHARGING MACHINES · OPEN HEARTH CHARGING MACHINES · SPECIAL MILL MACHINERY · STRUCTURAL FABRICATION · COKE PUSHERS

World's Largest Builders of the World's Largest Cranes



NEW PRODUCTS and equipment

Reply card on page 133 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

Zinc, Tin Plate Gage

. . . production line measuring

An AccuRay gage is designed for production line measurement of the amount of tin and zinc plated on steel, either electrolytically or by the hot dip process.

The model RBM is a noncontacting beta reflection gage, developed

to record thickness of metal coatings instantaneously and continuously. It handles tin plating in the range of ¼ to 1 pound/b/b. and electrolytic zinc from 0.1 ounce/ft² to 3 ounces/ft². Basic components are a source of radiation, a radiation detector and a recording console. Industrial Nucleonics Corp.

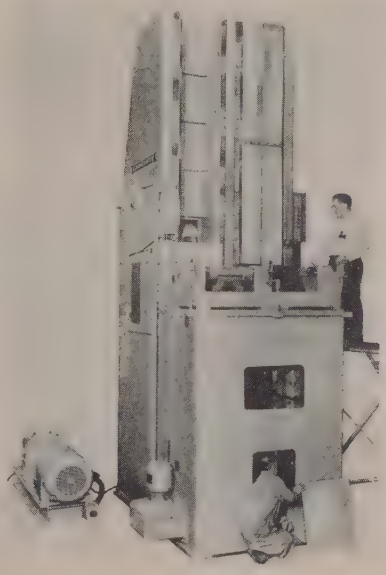
FOR MORE DATA CIRCLE NO. 1 ON REPLY CARD

Vertical Broaching Machine

. . . electro-mechanical drive

Designed primarily for high-production broaching of large aircraft engine turbine buckets, this vertical broaching machine with electro-mechanical drive is adaptable to mass production of many other parts requiring surface broaching.

Variable speeds are obtainable through a turn of a knob on the side of the machine. The electro-mechanical drive is designed around a constant torque variable speed dc motor, through a double gear box and using a positive lock between the two rams. The main drive gear is a continuous tooth



herringbone type gear and rack. The second reduction is through helical gears and the third is through a spiral bevel gear coupled through a dc motor. Lapointe Machine Tool Co.

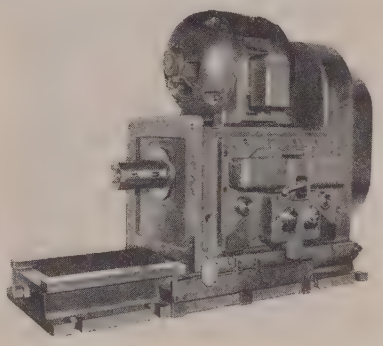
FOR MORE DATA CIRCLE NO. 2 ON REPLY CARD

Hydraulic Feed Unit

. . . for production flexibility

Self-contained, the new hydraulic feed unit provides a single purpose machining efficiency, yet maintains wide production flexibility at low cost.

The most outstanding design feature of the new unit is the completely and easily removable power pack panel. This panel slides entirely out of the unit and permits fast simple inspection and adjustment. When drive motor is started it operates hydraulic pump and unit cycles automatically through rapid approach, feed, rapid return and shut off. The hydraulic feed is valve controlled and variable. The spindle is hardened and ground tapered mounted in Timken taper roller bearings. A



range of speeds is possible with pick-off gears depending on the motor used. Hoefer Mfg. Co.

FOR MORE DATA CIRCLE NO. 3 ON REPLY CARD

Automatic Welding Equipment

. . . wide weld in single pass

Automatic welding equipment for producing beads up to 4 inches wide in a single pass is called Spreadarc. It is an attachment that mounts on a standard Lincoln-weld automatic head and oscillates the head back and forth at right angles to the direction of travel. Amount of oscillation can be controlled to produce a pad of weld metal up to 4 inches in width in a single pass.

It may be used to build up a layer of hardsurfacing metal or to build up with mild steel. Under proper conditions it may also be used to overcome poor fit-up conditions encountered in welding a joint.

It may be installed on Lincoln-

How Do You Buy Socket Screws?

Many buyers continue to specify some one make by *habit*. They have no particular preference for it, but they think of *all* such fasteners simply as "screws with hex sockets" — *all* makes substantially *alike*.

If you buy that way, and have never tried P-K Socket Screws, just break the habit once, and give them an actual assembly test. You'll get a pleasant surprise.

You'll find that the hex shape of the socket is about the *only* way that other makes and P-K are "alike".

Look Beyond the Hex

It pays to *look beyond the socket* when you buy Socket Screws. Compare every detail of product and service. You'll find P-K Socket Screws take top rating in every test. You get exclusive features that simplify and speed up assembly. You get quality matched to a firm guarantee. You get planning and buying information exactly patterned to your needs.

You need *all* these essentials for cost-wise assembly. Why miss out on *any* of them? Just try P-K Socket Screws. Get samples from your P-K Distributor, or write: Parker-Kalon Division, General American Transportation Corporation, 200 Varick St., New York 14.

for all the essentials of cost-wise assembly

PARKER-KALON

IN STOCK for immediate delivery — see the nearby P-K Socket Screw Distributor —

IRST
nd Thread
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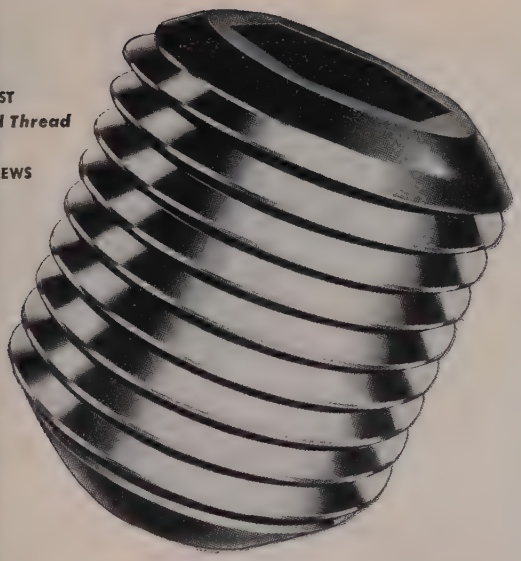
CREWS



ONLY
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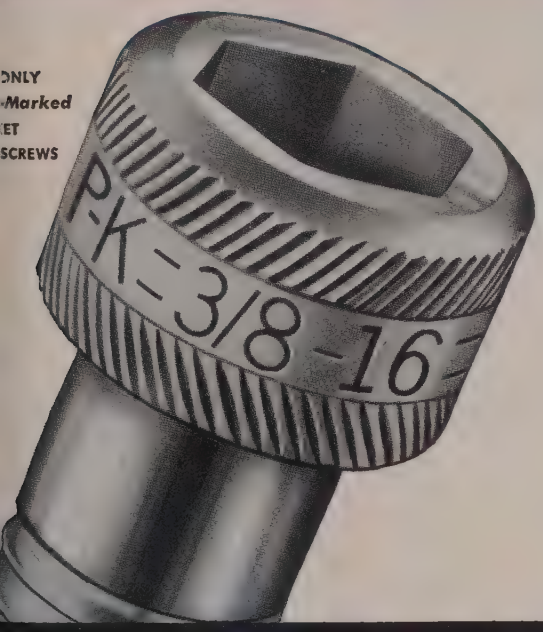


In Socket Set Screws PARKER-KALON gives you

- **GROUND THREADS** — at no extra cost. Gage-like precision, mirror-smooth finish — uniform, dependable Class 3 tolerance. Mechanics like their easy starting, easy keying.
- **PROVED ASSEMBLY STRENGTH** The "proving ground" is the millions of assemblies made by thousands of satisfied users of P-K Socket Screws, whose products are used everywhere, many under the toughest conditions of vibration.

In Socket Cap Screws PARKER-KALON gives you

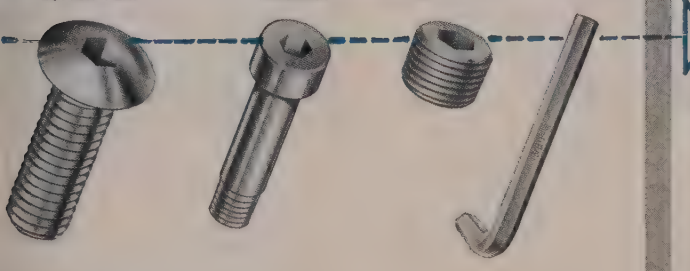
- **SIZE-MARK** — offered only by P-K. Incised on the head of each screw, it saves time and wasted screws when sizes get mixed up, prevents errors by green help. Maintenance and service men like Size-mark, it helps in reassembling.
- **GEAR GRIP** Meshing firmly with finger tips, it prevents slipping and fumbling when hands are oily, speeds starting.
- **MAXIMUM STRENGTH** Head, socket, and threads are accurately formed by Parker-Kalon's cold-pressure process. Steel structure "flows" to conform to all contours, assures maximum strength at points of greatest stress.

In all Socket Screws PARKER-KALON gives you

- **GUARANTEED FIRST QUALITY** Based on tests and inspections at every step in production — an exacting routine of quality control supervised by P-K laboratory Technicians.
- **FULL RANGE OF STYLES AND SIZES** You'll find any Socket Screw you need, NC or NF, in P-K's complete line, and Hex Keys in all sizes, and in several handy sets. Ask your P-K Distributor for the P-K Price List, Catalog, — any information you need. Slide chart Socket Screw Dimension Finder Free.

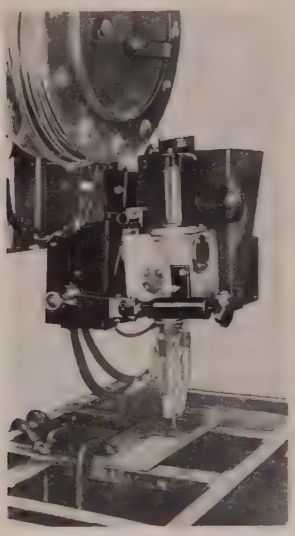
SOCKET SCREWS

BUTTON HEAD SHOULDER PIPE PLUGS HEX KEYS



our local Supply and Service Specialist

weld heads now in use without any major changes. It is powered by its own variable speed electric mo-



tor which, through an eccentric, oscillates the entire welding head assembly. Lincoln Electric Co.

FOR MORE DATA CIRCLE NO. 4 ON REPLY CARD

Specification Chart

. . . for Meehanite metals

A useful calculating wheel created as an aid to designers, engineers or anyone requiring a quick source of all physical properties of the various types of Meehanite metals available to industry, is

found in the "Physical Specification Chart for Engineering Design."

It provides engineering characteristics of all metals in the four major classifications under which Meehanite castings are produced: General engineering, heat-resisting, corrosion-resisting and wear-resisting. Meehanite Metal Corp.

FOR MORE DATA CIRCLE NO. 5 ON REPLY CARD

Forming, Press Brake

. . . controlled pressure

This stub type power press brake was developed primarily for V-forming, U-forming, general forming and other such requirments necessitating controlled pressure at the point of operation, having completely controlled recorded pressure throughout the work cycle.

Work cycle is divided into a low pressure advance to the work and high pressure for forming or shaping period of work cycle. Fully automatic cycling, consisting of low pressure advance and high pressure forming and controlled retreat

is possible. Length of stroke can be varied from 2 to 11 inches. The entire unit works off the shop air line and has a capacity of 42 tons at 100 psi. Dayton Rogers Mfg. Co.

FOR MORE DATA CIRCLE NO. 6 ON REPLY CARD

DC FHP Motors

. . . improved terminal box

An enlarged terminal box and improved brush mounting are features of GE's line of 60 and 70-frame dc motors. Terminal box has been enlarged to six-lead capacity for greater ease of installation. Changing the contour of the commutator end-shield to accommodate larger, cast-in box has not altered the motor's basic dimensions.

Rubber mounted bearings have increased life and give quieter operation with less vibration. Brush assembly is designed for greater creepage distance, higher dielectric strength and improved aging characteristics. With speeds of 1725,

1140 or 860 rpm, the new motors are available in ratings of ⅓, ½ and ¾ hp and 115/230 v. General Electric Co.

FOR MORE DATA CIRCLE NO. 7 ON REPLY CARD

Aluminum Shot

. . . for deoxidizing steels

Aluminum shot, approximately $^{3}/_{8}$-inch in diameter, is available for deoxidizing high grade steels and for alloying with zinc to make Zamak No. 3 and No. 5 alloys.

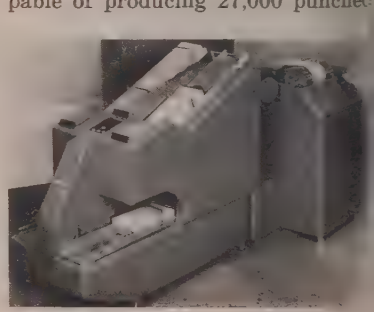
The material is made as slightly flattened spheroids, free from sharp points and solid, with a tolerance range of $\pm$ ⅛-inch on the standard $^{3}/_{8}$-inch diameter. The shot is packed in 100-pound multiple-ply paper bags and banded onto wooden pallets for fork truck handling. Reynolds Metals Co.

FOR MORE DATA CIRCLE NO. 8 ON REPLY CARD

Accounting Machine

. . . integrates several steps

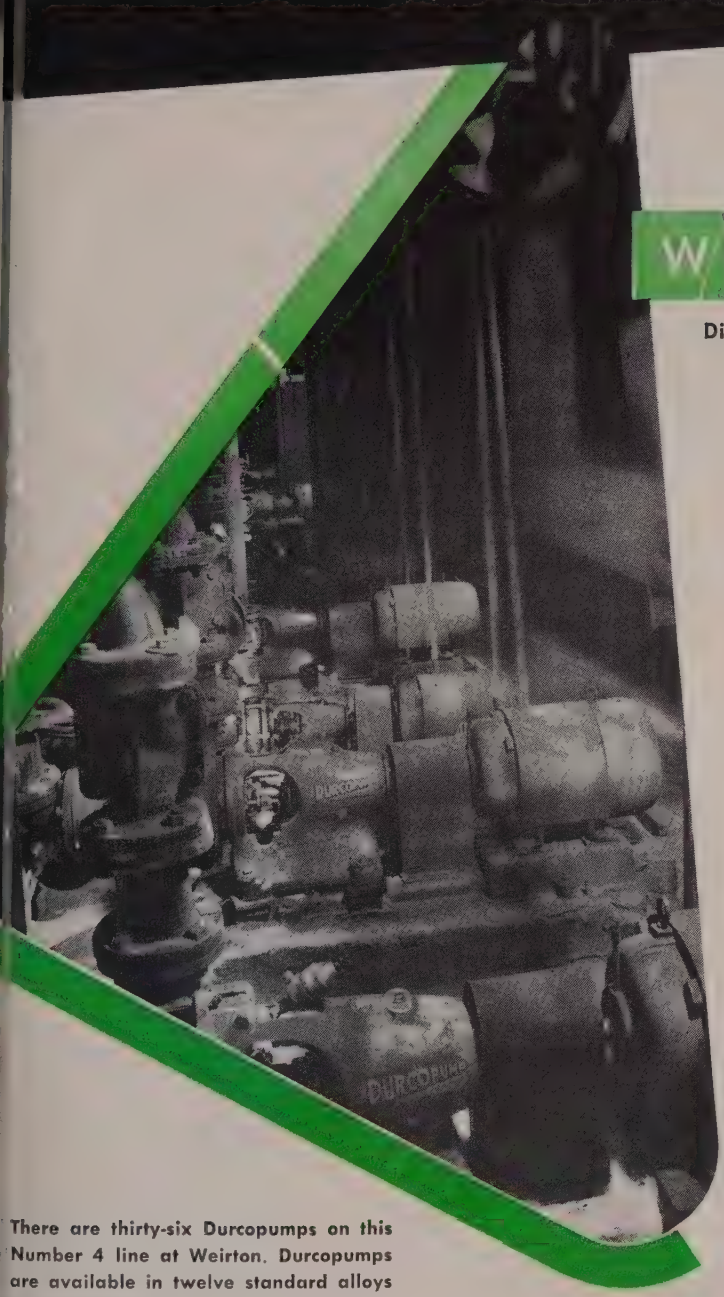
An automatic high-speed printing and accounting machine is capable of producing 27,000 punched



card paychecks an hour, handling in the process up to 108,00 punched cards.

The machine operates at a speed of over 43,000 characters a minute. The series G machines, by synchronizing high speed totaling printing and card punching, w

DURCOPUMPS resist corrosion in electrolytic tinplate production at . . .



There are thirty-six Durcopumps on this Number 4 line at Weirton. Durcopumps are available in twelve standard alloys to supply heads to 240 feet and capacities to 2000 G.P.M.

Weirton Steel Company

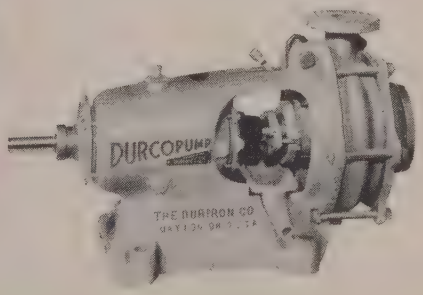
Weirton, West Virginia

Division of National Steel Corporation

Durcopumps handle the severely corrosive tin plating solutions at Weirton. These DuPont halogen solutions with low pH and containing fluorides are continuously circulated from collecting tanks to plating trays by Durimet 20 Durcopumps, which are completely insulated from stray currents. Weirton also uses Durco transfer pumps, filter pumps and sludge pumps.

Weirton Steel Company, division of National Steel Corporation, operates the world's largest single tin mill. The strip on the lines moves as fast as 2000 feet per minute. An example of Weirton thoroughness is the ability to plate a different thickness on each side of the strip to best meet customer requirements.

Durco products have been the answer to thousands of tough chemical service problems. Maybe we can solve yours. Write for Catalog 54 or call the Durco engineer in your area.



DURCO
CORROSION RESISTING ALLOYS & EQUIPMENT

THE DURIRON COMPANY, INC., DAYTON, OHIO

Branch offices in principal cities

integrate in one fast operation a number of separate steps in the accounting process. Burroughs Corp.

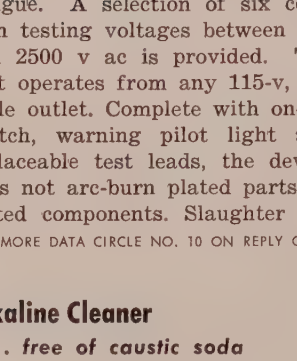
FOR MORE DATA CIRCLE NO. 9 ON REPLY CARD

Insulation Tester

. . . signals for rejects

Operators performing repetitive tests for insulation breakdown or grounds in electrical sub-assemblies can watch their work at all times. This tester gives a buzzer and light signal on rejects.

Testing prods retract for safety and are designed to avoid wrist



fatigue. A selection of six common testing voltages between 500 and 2500 v ac is provided. The unit operates from any 115-v, 60-cycle outlet. Complete with on-off switch, warning pilot light and replaceable test leads, the device does not arc-burn plated parts on tested components. Slaughter Co.

FOR MORE DATA CIRCLE NO. 10 ON REPLY CARD

Alkaline Cleaner

. . . free of caustic soda

A new alkaline cleaner for use in mechanical spray washers prior to phosphate coating and which is entirely free of caustic soda will find wide application in the metal-fabricating industry.

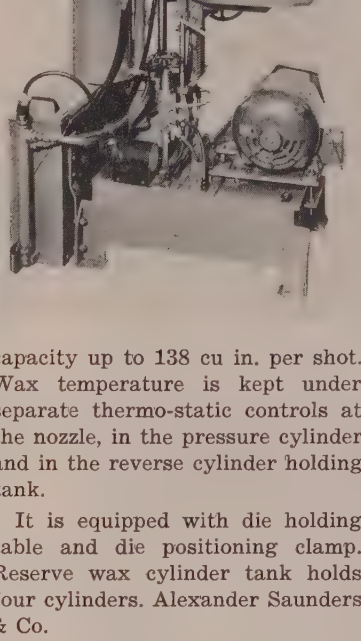
By eliminating caustic soda, the crystalline structure of the phosphate coating is made finer and more effective. It may be used at varied concentrations and temperatures for removal of oils and greases from fabricated parts prior to subsequent operations. It has a balanced formulation which permits saponification as well as emulsification of soils when in solution. Detrex Corp.

FOR MORE DATA CIRCLE NO. 11 ON REPLY CARD

Wax Injection Press

. . . for pattern reproduction

A wax injection press, developed for pattern reproduction, has a pressure range up to 1000 psi and



capacity up to 138 cu in. per shot. Wax temperature is kept under separate thermo-static controls at the nozzle, in the pressure cylinder and in the reverse cylinder holding tank.

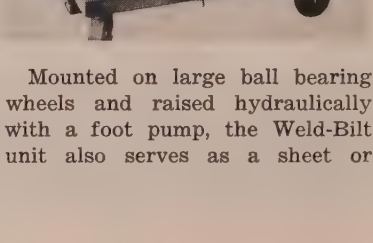
It is equipped with die holding table and die positioning clamp. Reserve wax cylinder tank holds four cylinders. Alexander Saunders & Co.

FOR MORE DATA CIRCLE NO. 12 ON REPLY CARD

Jig and Die Lift Table

. . . handles 2000 pounds

To handle heavy jigs and dies weighing up to 2000 pounds, West Bend Equipment developed a portable table lift with a flat steel swivel top.



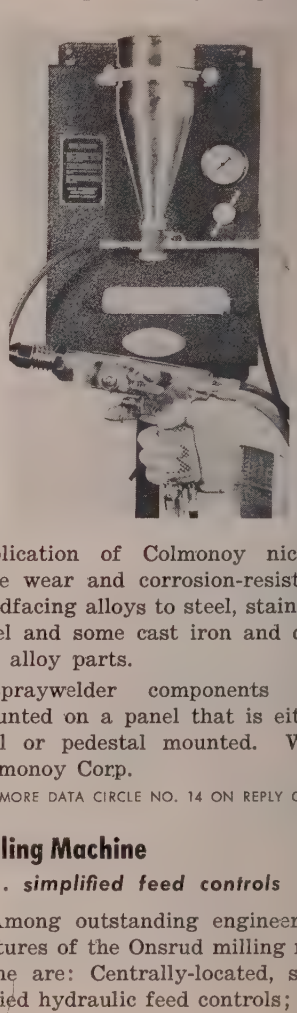
Mounted on large ball bearing wheels and raised hydraulically with a foot pump, the Weld-Bilt unit also serves as a sheet or strip feeding table, an easily moved portable elevator for loading trucks, storing tools and dies or as a temporary work bench. The table has a lift of from 28 inches up to 42 inches. West Bend Equipment Corp.

FOR MORE DATA CIRCLE NO. 13 ON REPLY CARD

Metal Hard-Facing Unit

. . . coats in powder form

A metal spray unit of improved design is designed for applying hard-facing coatings in powder form. The unit, model C Spray-welder, is particularly adapted to



application of Colmonoy nickel-base wear and corrosion-resistant hardfacing alloys to steel, stainless steel and some cast iron and copper alloy parts.

Spraywelder components are mounted on a panel that is either wall or pedestal mounted. Wall Colmonoy Corp.

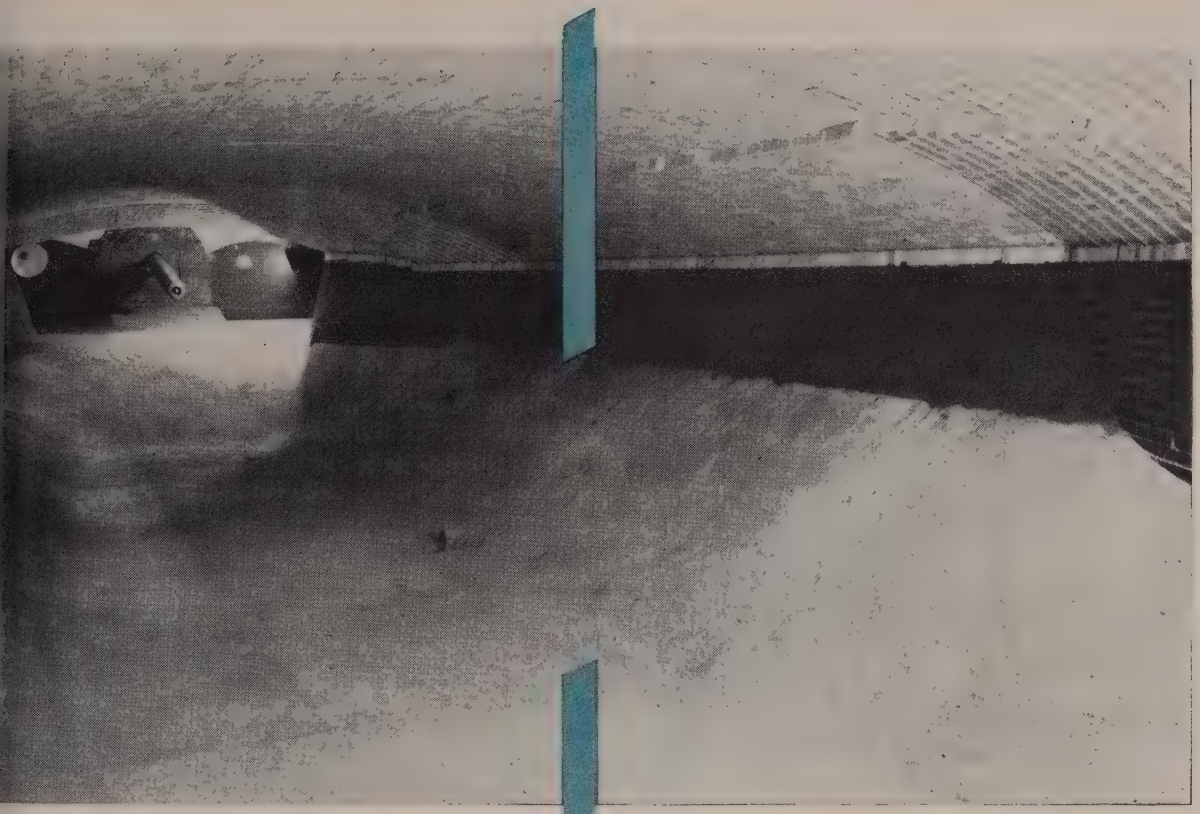
FOR MORE DATA CIRCLE NO. 14 ON REPLY CARD

Milling Machine

. . . simplified feed controls

Among outstanding engineering features of the Onsrud milling machine are: Centrally-located, simplified hydraulic feed controls; the fact that manual control can take over at any time without stopping the hydraulic system; the directional, knee, cross and table feed controls with five forward and reverse positions including rapid traverse; table speeds from 0 up to 150 ipm.

The 7½-15-hp, 3600/7200-rpm



HARBISON-WALKER

Announces

H-W C-MIX

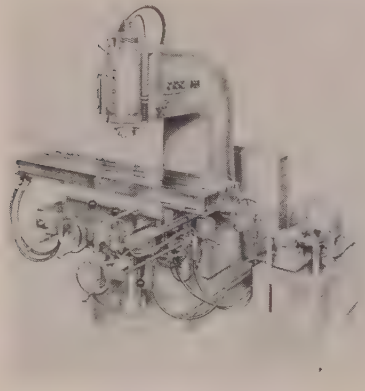
(Seawater Magnesite Mixture)

A NEW 92% Magnesia Ramming Mixture for open hearth furnace bottoms

- **HIGH STRENGTH**
  Over 4000 psi crushing strength after heating to 2910°F.
- **HIGH DENSITY**
  172 lb. per cu. ft. (rammed)
- **LOW SHRINKAGE**
  Less than 1% when reheated to 2910°F. (ASTM C 113-46)
- **MADE FROM HIGH-PURITY SEAWATER MAGNESITE**

HARBISON-WALKER REFRACTORIES COMPANY
AND SUBSIDIARIES
World's Largest Producer of Refractories
GENERAL OFFICES PITTSBURGH 22, PENNSYLVANIA

spindle motor is raised or lowered by air and manually operated for close adjustment. Capacity is



19¾ inches, less cutter width; length, 28 inches. Table size is 14 x 26 inches. Onsrud Machine Works Inc.

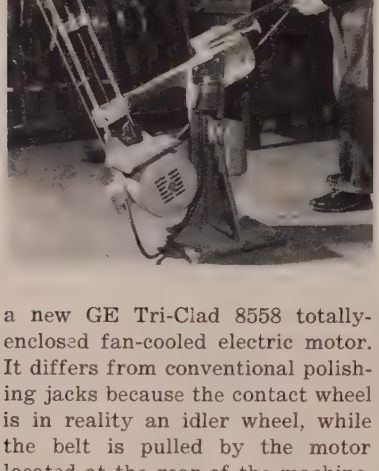
FOR MORE DATA CIRCLE NO. 15 ON REPLY CARD

Belt-Polishing Unit

. . . single-base mounting

This belt polishing machine, with contact and idler wheels and drive motor all mounted on a single base, occupies a minimum amount of space and simplifies installation, eliminates tracking problems and reduces the need for adjustment during operation.

The Bader Space Saver features



a new GE Tri-Clad 8558 totally-enclosed fan-cooled electric motor. It differs from conventional polishing jacks because the contact wheel is in reality an idler wheel, while the belt is pulled by the motor located at the rear of the machine. Stephen Bader & Co.

FOR MORE DATA CIRCLE NO. 16 ON REPLY CARD

FREE LITERATURE

Catalogs and Clip Sheets

Reply card on page 133 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

Surface Grinder

Niles-Bement-Pond Co.—Pratt & Whitney Division offers a bulletin on their Model D, 14-inch hydraulic vertical surface grinder. Its advantages and working features are described in detail. Specifications are listed on the back

FOR MORE DATA CIRCLE NO. 17 ON REPLY CARD

Heating, Ventilating

Westinghouse Electric Corp.—Two catalogs, one on commercial and industrial heating and ventilating units, the other on air conditioning units, are available from Westinghouse. Each 40-page catalog is divided into five separate data sections: Descriptive, performance, layout, engineering and service. Hypothetical problems are calculated and solved. Specifications, maintenance instructions are covered.

FOR MORE DATA CIRCLE NO. 18 ON REPLY CARD

Radiamatic Pyrometers

Minneapolis-Honeywell Regulator Co.—Catalog 9301 covers the four types of Radiamatic radiation detectors for measuring temperatures from 125 to 7000° F. General specifications are included for the general purpose, small target, the miniature and the low range Radiamatic radiation detectors, their accessories and ElectroniK instruments and millivoltmeter pyrometers for use with these detectors.

FOR MORE DATA CIRCLE NO. 19 ON REPLY CARD

Lift Truck

Baker-Raulang Co.—Baker Industrial Truck Division offers an 8-page bulletin describing and illustrating the Traveloader. The bulletin explains the Traveloader system of handling, uses photos and drawings to show how the machine cuts aisle requirements. One section illustrates typical applications and shows the different attachments available for special handling jobs.

FOR MORE DATA CIRCLE NO. 20 ON REPLY CARD

Metalworking Machinery

South Bend Lathe Works—Catalog 5406 illustrates and offers full specifications on South Bend's many models and sizes of metalworking machinery. Subject matter covers a complete line of precision toolroom lathes in bench and floor models, several turret lathe models, drill presses in bench, floor and multiple spindle production models. Also cataloged is the new pedestal tool grinder.

FOR MORE DATA CIRCLE NO. 21 ON REPLY CARD

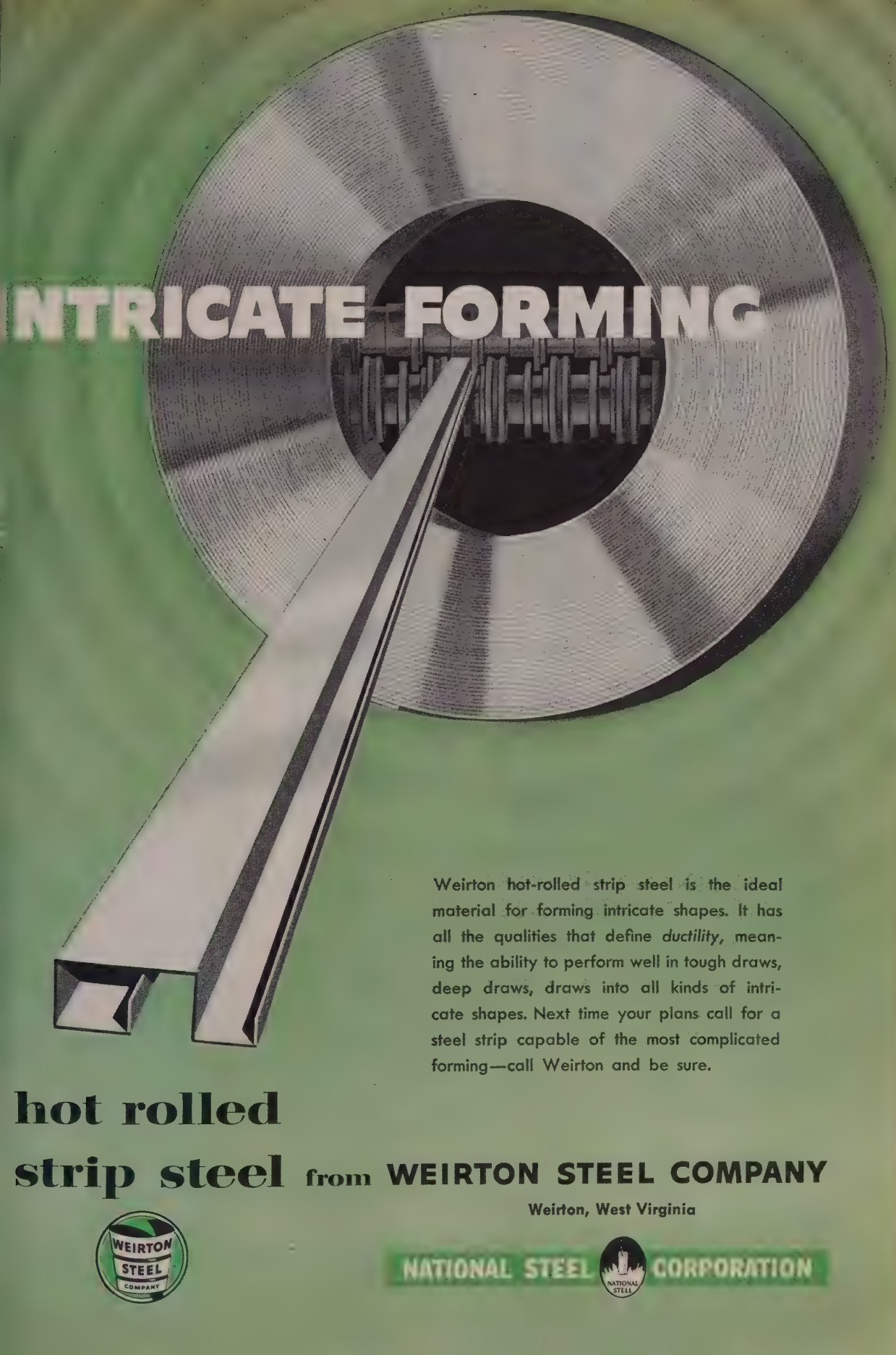
Adhesives, Coatings

Minnesota Mining & Mfg. Co.—Adhesives and Coatings Division offers an up-to-date list of 3M adhesives, coatings and sealers, meeting government specification requirements, in a pocket sized booklet. Cross reference table shows the current specification number with the spec that it supersedes. A short description of the end use is listed.

FOR MORE DATA CIRCLE NO. 22 ON REPLY CARD

Cutting Oil Bases

D. A. Stuart Oil Co.—A booklet detailing four principal oil bases prescribed for tapping, threading, broaching, gear hobbing, automatic screw machine and turret lathe work on a wide variety of metals is made available by D. A. Stuart. Versatility and economy of their bases is illustrated through adaptability to every type



Weirton hot-rolled strip steel is the ideal material for forming intricate shapes. It has all the qualities that define *ductility*, meaning the ability to perform well in tough draws, deep draws, draws into all kinds of intricate shapes. Next time your plans call for a steel strip capable of the most complicated forming—call Weirton and be sure.

hot rolled

strip steel from WEIRTON STEEL COMPANY

Weirton, West Virginia

WEIRTON STEEL COMPANY

NATIONAL STEEL CORPORATION

COLD ROLLED STRIP

• True strip gauge tolerance • Uniform quality • Controlled tempers and finishes • Specialty steel service from mills

When you specify Follansbee Cold Rolled Strip, you get more than just the width you require. You're also sure of true strip gauge tolerance and uniform quality, as well as the right temper and working qualities necessary in your press operation.

Follansbee Cold Rolled Strip offers you many advantages. Consult your Follansbee Steel Representative about the quick, personalized service you get directly from the Follansbee Mill. His suggestions can be of real help.

FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES, PITTSBURGH 30, PA.

Polished Blue Sheets and Coils • Seamless Terne Roll Roofing • Cold Rolled Strip

Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee, Chicago, Indianapolis, Kansas City, Nashville, Los Angeles, San Francisco, Seattle; Toronto and Montreal, Canada. *Plants*—Follansbee, West Virginia

FOLLANSBEE METAL WAREHOUSES: Pittsburgh, Pa., Rochester, N.Y., Fairfield, Conn.

of machining operation on a variety of materials. This 16-page bulletin's back cover lists points of U. S. and foreign distribution.

FOR MORE DATA CIRCLE NO. 23 ON REPLY CARD

Battery Maintenance

Electric Storage Battery Co.—Publication of an 8-page pocket-sized booklet on storage battery maintenance has been announced. The booklet breaks down battery care to seven basic rules, each emphasized with a cartoon treatment and a minimum of explanatory text. Four and a half by seven inches, the booklet is suitable for distribution to maintenance personnel and others who have to deal with batteries.

FOR MORE DATA CIRCLE NO. 24 ON REPLY CARD

Tubing and Pipe

Wallingford Steel Co.—Availability of an 8-page booklet, "Wallingford Quality Tubing and Pipe," is announced. The cover lists the variety of quality tubing they offer. Each type of tubing and the applications for which it is suitable are explained in detail. Production, research and control facilities of the company are described briefly.

FOR MORE DATA CIRCLE NO. 25 ON REPLY CARD

Hydraulic Press Maintenance

Denison Engineering Co.—"Hydroilics, Selection and Use of Hydraulic Oils" outlines some of the more important points in a well planned hydraulic preventive maintenance program. Factors affecting hydraulic oil performance, procedure to assure suitable oil condition and operating notes are among the subjects covered in this 15-page bulletin.

FOR MORE DATA CIRCLE NO. 26 ON REPLY CARD

Drilling, Broaching Equipment

Zagar Tool Inc.—This company's drill heads, drill jigs, feed units, drilling and broaching machines are described in an 8-page brochure. Each is briefly described and illustrated. Advantages and specifications are covered.

FOR MORE DATA CIRCLE NO. 27 ON REPLY CARD

Air Type Burners

Hauck Mfg. Co.—Hauck has announced a new line of series 62 P Vari-Pressure low pressure air type burners, described in a new

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FORMATION ON ADVERTISED PRODUCTS

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age bulletin. Detailed descrip-
n is supported with illustrations
l charts giving the capacities
oil, gas and air burners with
uced air.
MORE DATA CIRCLE NO. 28 ON REPLY CARD

search at Alcoa

Aluminum Co. of America —
ty-five years of light metals
earch sets the theme for a 54-
ge booklet, "Research at Alcoa."
addition, it also provides a use-
bibliography of technical arti-
s about aluminum. A brief his-
ical note, preceding the first
tion, outlines the work of Al-
's 14 research divisions.
MORE DATA CIRCLE NO. 29 ON REPLY CARD

etal Gratings

Penn Metal Co. Inc.—Penn has
ued a new 28-page catalog de-
cribing its complete line of stand-
d and flattened expanded metal
d expanded metal gratings. In-
ded are tables of sizes, weights
d dimensions for different mesh-
in carbon steel, aluminum,
ainless steel, Monel and Inconel.
ustrations of available accesso-
s, air flow tables and fabrica-
n data are included.
MORE DATA CIRCLE NO. 30 ON REPLY CARD

ear Speed Reducers

D. O. James Gear Mfg. Co.—An
tensive catalog on gear speed re-
cers has been published by D. O.
mes. Informative engineering
ta on the spiral bevel gear, spi-
l bevel herringbone, spiral bevel
lical gear speed reducers and
ral bevel planetary gear speed
ducers are given.
MORE DATA CIRCLE NO. 31 ON REPLY CARD

ow Meters

Minneapolis-Honeywell Regula-
r Co.—Catalog 2320 describes all types of flow meters made by Minneapolis - Honeywell's Indus-trial Division. It includes, in 54 pages, indicating, recording, inte-grating and controlling instru-ments of both evenly-graduated and square root types, as well as area meters and differential con-verters. Also included is a sec-tion on flow approximations and installation information.
FOR MORE DATA CIRCLE NO. 32 ON REPLY CARD

General Catalog

Precise Products Corp.—A gen-eral 11-page catalog covers their complete line of precision built portable electric grinder-millers, power quills, machine tool mounts and accessories. Each description is accompanied by a photograph of the particular tool.
FOR MORE DATA CIRCLE NO. 33 ON REPLY CARD

Insulated Wire, Cable

U. S. Rubber Co.—A 140-page illustrated book contains engineer-ing references and descriptions of insulated wire and cables made for the electric utility industry. Prepared by the Electrical Wire & Cable Department, the book contains chapters on the com-pany's insulation compounds, jack-et compounds, service, street-lighting, power and control ca-bles, bare and weatherproof wires and cables, portable cords and ca-bles and insulated aluminum con-ductors.
FOR MORE DATA CIRCLE NO. 34 ON REPLY CARD

Liquid, Gas Controls

Simplex Valve & Meter Co.—A revised edition of their general catalog of measuring and control equipment supersedes a volume produced in 1950. Brought up-to-date and revised, it presents a

For free literature, editorial clips or more information on products described in this section, circle the corre-sponding number at left. Fill in box below for articles or advertisements not numbered.

ARTICLE OR ADVERTISEMENT	PAGE

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COMPANY _____

PRODUCTS MANUFACTURED _____

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CITY AND STATE _____

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5	15	25	35	45	55	65	75	85
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7	17	27	37	47	57	67	77	87
8	18	28	38	48	58	68	78	88
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(Sec. 34.9 P.L.&R.)
CLEVELAND, OHIO

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STEEL

Penton Building

Cleveland 13, Ohio

Readers Service Dept.

compilation of 36 pages, all valuable to operating and supervisory plant personnel. It lists all equipment for the measurement and control of liquids and gases.
FOR MORE DATA CIRCLE NO. 35 ON REPLY CARD

Corrosion Prevention

Industrial Metal Protectives Inc.—To help determine the type of coating best suited to your particular corrosion problem this company has published a comparison chart of its twelve Zincilate protective coatings. The chart gives complete information on the resistance of each finished coating to various corrosive elements.
FOR MORE DATA CIRCLE NO. 36 ON REPLY CARD

Rotary Pump Line

Viking Pump Co.—This company offers a 10-step illustrated how-to-do-it manual for the application of their rotary pump line. Six pages of charts, formulae and tables bring out all related data. Characteristics of most liquids are included.
FOR MORE DATA CIRCLE NO. 37 ON REPLY CARD

Materials Handling

Gifford-Wood Co.—A 32-page bulletin titled "Engineered Materials Handling Systems" describes and illustrates specific industrial examples of Gifford handling. It gives technical information on their enclosed elevator for handling chemicals and covers, en masse, screw, vibrating, flight, slat and belt conveyors. A section on mechanical methods illustrates transferring or feeding bulk materials.
FOR MORE DATA CIRCLE NO. 38 ON REPLY CARD

Electric Products

Wagner Electric Corp.—An 18-page bulletin is offered by Wagner which covers their electrical and automotive products. Motors, transformers, industrial brakes, motor service, hydraulic brake units, Lockheed hydraulic brake parts and fluid, brake lining and other friction material, and service tools and equipment, air brake units, tachographs are included.
FOR MORE DATA CIRCLE NO. 39 ON REPLY CARD

Casting Alloys

R. Lavin & Sons Inc.—The May issue of "The LaVingot News and Views" contains specifications and test bar designs of nonferrous-ingot and casting alloys. They were compiled to meet a need for simple charts which would indicate at a glance this essential data. Included are specification numbers, chemical compositions, physical properties and test bar designs.
FOR MORE DATA CIRCLE NO. 40 ON REPLY CARD

EDITORIAL REPRINTS:

Annual Wage

This year major unions are all pressing for some form of guaranteed annual wage. What positive counter-proposals or counter-steps can industry make that will help stabilize employment, yet avoid the prohibitive costs and other dangerous results of GAW? In the fourth in its series, Program for Management, page 87, STEEL suggests several approaches and gives the results of some management studies of the economic consequences of GAW.
FOR MORE DATA CIRCLE NO. 41 ON REPLY CARD

Heat Treatment

Part I of this series begins on page 102. The article covers the importance of carbon in heat treating. Strength, hardness and many other important properties of steel also depend on size and distribution of carbide particles formed from the carbon in its structure. Here's why.
FOR MORE DATA CIRCLE NO. 42 ON REPLY CARD

Production Impressions

Just as we record sound, General Electric Co.'s record-playback replays production impressions. The system is chiefly one of recording motion on magnetic tape and playing it back for automatic programming of production and process. A typical job is cited in the story on page 100.
FOR MORE DATA CIRCLE NO. 43 ON REPLY CARD

Blast Furnace Operation

Development of the art of producing pig iron to its modern conception is the result of application of the technical sciences. Correlation of blast furnace concepts is described in Part I of a series by Charles Agnew beginning on page 106.
FOR MORE DATA CIRCLE NO. 44 ON REPLY CARD

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5	15	25	35	45	55	65	75	85
6	16	26	36	46	56	66	76	86
7	17	27	37	47	57	67	77	87
8	18	28	38	48	58	68	78	88
9	19	29	39	49	59	69	79	89
10	20	30	40	50	60	70	80	90

5-17-54

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PRODUCTS MANUFACTURED _____
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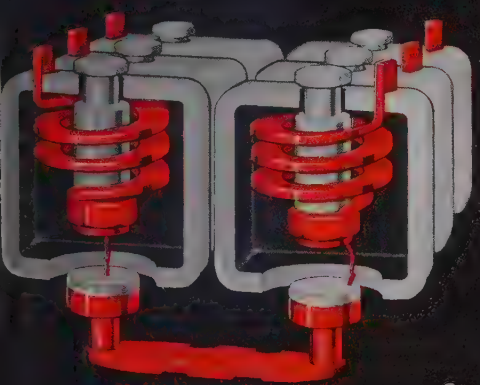
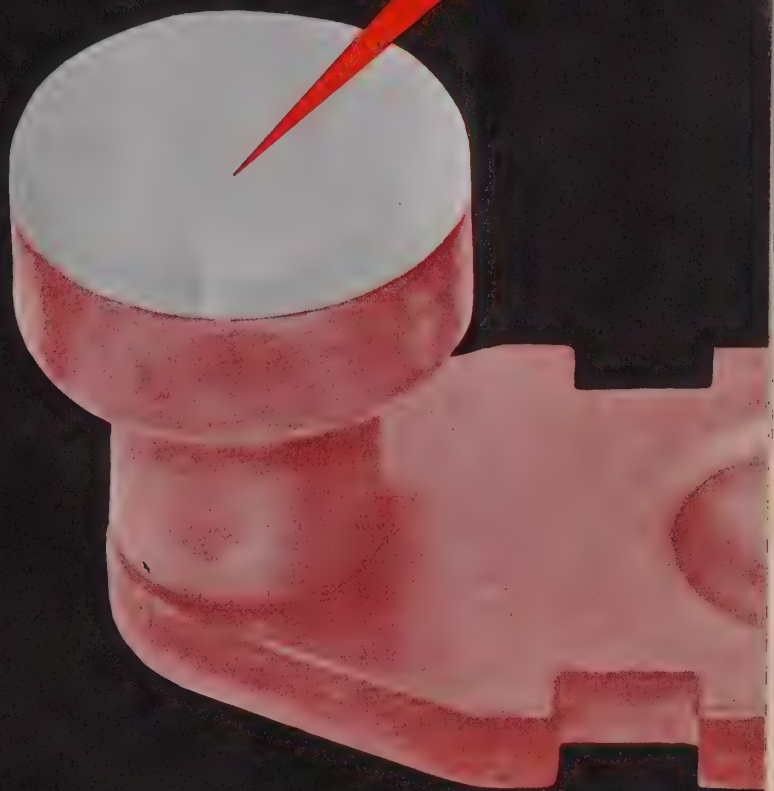
CONTROLLED LIGHTNING

CLARK Type "CY" AC MAGNETIC STARTERS effectively control the millions of miniature lightning flashes (arcs), which bombard the contact tips—to prevent burning, pitting or build-up at any one point. This is accomplished by the use of strong multi-turn magnetic blow-outs and double-break contacts. Forced rotation causes the arc to move continually over contact surfaces to distribute the heat. Moreover, the magnetic field tends to quench the arc by further lengthening or confining it. Result: Contact tips never require filing, dressing or cleaning and you get more dependable performance and longer contact life with less maintenance.





CLARK Type "CY" Starters offer many other advantages. Steel arc chambers are non-carbonizing—The solid top construction limits ionized gases between wiring terminals. Cabinets are designed to provide ample wiring space for easy installation. No tools are required to inspect contacts. All contacts as well as other components which may require service are quickly and easily accessible for inspection, removal and replacement.

THE CLARK CONTROLLER CO.

ENGINEERED ELECTRICAL CONTROL

1146 EAST 152nd STREET, CLEVELAND 10, OHIO

See reverse side for range of sizes, enclosures and combinations.

CLARK type "CY" AC MOTOR STARTER

available in sizes, combinations and enclosures

TO MEET YOUR REQUIREMENTS

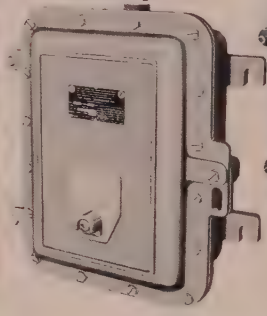
SIZES: *0, 1, 2 and 3. Sizes 2 and 3 employ the new "CY" arc interrupting principle*

BASIC Across-The-Line STARTER

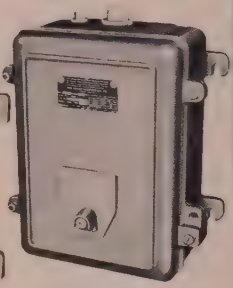
NEMA Type 1
General Purpose

NEMA Type 4
Water-tight

NEMA Type 5
Dust-tight



NEMA Type 7
Explosion Resisting
for hazardous gas



NEMA Type 9
Explosion Resisting
for hazardous dust

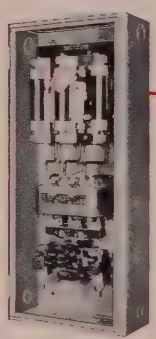
Open view — showing accessibility and generous wiring space

TYPES OF ENCLOSURES

COMBINATION STARTERS

NEMA Type 1
General Purpose

NEMA Type 1A
Semi-Dust-tight



Bulletin 6018 Combination AC Magnetic Starter, with Fusible Disconnect Switch.

Bulletin 6020 Combination AC Magnetic Starter with Air Circuit Breaker.

TYPES OF ENCLOSURES

A WIDE VARIETY OF MOD

are available for ev
application within t
horsepower limits

NEMA Type 4
Water-tight

NEMA Type 5
Dust-tight

NEMA Type 7 for hazardous gas

NEMA Type 9 for hazardous dust

NEMA Type 12 Industrial Type

THE CLARK CONTROLLER COMPANY

1146 EAST 152nd STREET • CLEVELAND 10, OHIO

Please send me 8-page descriptive literature on Clark Type "CY" Starters.

NAME .....

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TYPE OF BUSINESS .....

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CITY AND STATE .....

Use this coupon for obtaining complete information on CLARK Type "CY" AC Motor Starters with the revolutionary new arc interrupting principle.

Market Outlook

POSITIVE SIGNS of recovery are seen in the steel industry.

Three steelmaking districts which felt a decline in ingot production a few weeks ago have climbed to around 80 per cent of capacity. They are: Wheeling, at 84 per cent; Chicago, at 80 per cent; and Cleveland, at 78 per cent.

ROLLING ADJUSTMENT—It looks as if the "rolling adjustment" that economists have been talking about is sweeping through the steel industry. Not all of the 13 steelmaking districts declined at the same time, depths of decline have not been uniform, and all districts are not recovering simultaneously.

In the week ended May 16, ingot production rose in five districts, declined in three, and remained unchanged in five. Net result was a rise of 1 point in the national ingot rate to 68 per cent of capacity. This rate yields 1,621,000 net tons of steel.

STANDOUT— Standing out currently for its booming performance is Inland Steel Co. in the Chicago district. Inland's ingot production for the week ended May 16 was scheduled at 103.7 per cent of capacity. In the preceding week it operated at 103.6 per cent. Inland expects its ingot production to be at or slightly above capacity for the rest of this quarter on the basis of orders on the books. Inland's lowest ingot production rate this year was 83.7 per cent at the beginning of March. It has been climbing steadily since then. However, Inland's rate of finishing has not gone below 95 per cent of capacity this year.

Other steel producers in the Chicago area were producing ingots at a high rate too, with a resultant 80-per-cent average for the district in the latest week.

ABOVE AVERAGE— The Chicago district ingot production rate has been above the national average all this year. Low point for the Chicago rate was 74.5 per cent in the week ended Apr. 11.

If the "rolling adjustment" that appears to have swept through the Wheeling, Chicago and Cleveland districts is symbolic of what can be expected in the other districts, the national ingot production rate should show an uptrend as the summer moves along.

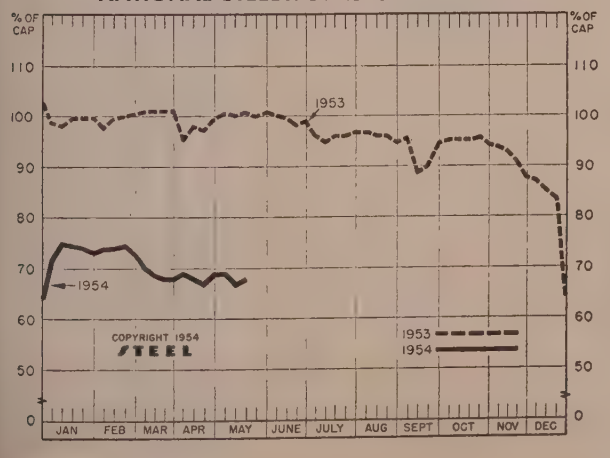
REASONABLE ASSUMPTION— The reduced rate of ingot production this year has been attributed to a move on the part of steel consumers and steelmakers to reduce their inventories of materials. If all of this inventory reduction can go on without lowering the national ingot production rate below the high 60s it's reasonable to expect that the rate will be higher after the liquidation is completed.

UNWORRIED—Buyers show little worry about a steelworkers' strike this coming summer. Actually there's more concern now about the possibility of expansion of military needs.

Hand-to-mouth ordering of steel still prevails. Users don't want to order it until it is needed, and then they want quick delivery.

SCRAP RISES—Long regarded as a good barometer of activity in the steel industry, scrap prices continued their advance in the latest week. They pushed STEEL's price composite on steelmaking grades to $27.67 a gross ton, highest level since the first week in February.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended May 16	Change	Same Week 1953	Same Week 1952
Pittsburgh	69	+ 1.5*	97.5	101.5
Chicago	80	+ 0.5*	106.5	103
Mid-Atlantic	56	0	97.5	88
Youngstown	68	0	105	105
Wheeling	84	+ 0.5	101	97.5
Cleveland	78	+ 2*	101	103.5
Buffalo	67.5	0	106.5	104
Birmingham	56.5	0	102	102
New England	50	— 5	93	70
Cincinnati	59.5	— 2	97	90
St. Louis	72.5	0	92	83.5
Detroit	64.5	+ 1.5	114.5	106
Western	56	—16	110	84
National Rate	68	+ 1	100.5	101

INGOT PRODUCTION‡

	Week Ended May 16	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	101.8†	103	101	140.8
NET TONS (In thousands)	1,636†	1,654	1,622	2,262

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,384,549 in 1954; 2,254,459 in 1953; 2,077,040 in 1952.

The Metalworking Outlook—p. 39

Technical Outlook—p. 97

PRICE INDEXES AND COMPOSITES

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics) Week Ended May 11

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For comple description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.400	Bars, H.R., alloy	$8.575	Strip, C.R., stainless, 430 (lb)	$0.415	Tin plate, hot-dipped, 1.25 lb	$8.4
Rails, light, 40 lb	5.767	Bars, H.R., stainless, 303 (lb)	0.418	Strip, H.R., carbon	4.963	Tin plate, electrolytic, 0.25 lb	7.1
Tie Plates	5.125	Bars, H.R., carbon	4.873	Pipe, black, buttweld (100 ft)	14.454	Black plate, can making quality	6.2
Axles, railway	7.250	Bars, reinforcing	4.900	Pipe, galv., buttweld (100 ft)	17.731	Wire, drawn, carbon	7.7
Wheels, freight car, 33 in. (per wheel)	47.000	Bars, C.F., carbon	7.960	Pipe, line (100 ft)	141.960	Wire, drawn, stainless, 430 (lb)	0.5
Plates, carbon	4.550	Bars, C.F., alloy	10.975	Casing, oil well, carbon (100 ft)	149.516	Bale ties (bundle)	5.6
Structural Shapes	4.367	Bars, C.F., stainless, 302 (lb)	0.433	Casing, oil well, alloy (100 ft)	214.113	Nails, wire, 8d common	7.4
Bars, tool steel, carbon (lb)	0.415	Sheets, H.R., carbon	4.756	Tubes, boiler (100 ft)	‡	Wire, barbed (80-rod spool)	6.8
Bars, tool steel, alloy, oil hardening die (lb)	0.505	Sheets, C.R., carbon	5.696	Tubing, mechanical, carbon (100 ft)	‡	Woven wire fence (20-rod roll)	16.1
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.075	Sheets, galvanized	6.895	Tubing, mechanical, stainless, 304 (100 ft)	161.193	‡ Not available.	
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.550	Sheets, C.R., stainless, 302 (lb)	0.548				
		Sheets, electrical	9.000				
		Strip, C.R., carbon	7.236				

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	May 11 1954	May 4 1954	Month Ago	Apr. Average
(1947-1949=100)	140.8	140.8	140.9	140.9

STEEL's FINISHED STEEL PRICE INDEX*

	May 13 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	189.74	189.74	189.74	181.31	154.01
Index in cents per lb	5.140	5.140	5.140	4.912	4.172

STEEL's ARITHMETICAL PRICE COMPOSITES

	May 13 1954	Week Ago	Month Ago	Year Ago	5 Yr Ag
Finished Steel, NT*	$113.70	$113.70	$113.70	$110.98	$93.
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	55.04	46.
Basic Pig Iron, GT	56.04	56.04	56.04	54.66	45.
Malleable Pig Iron, GT	57.27	57.27	57.27	55.77	47.
Steelmaking Scrap, GT	27.67	27.33	25.33	38.83	22.

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 5 of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

COMPARISON OF PRICES

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	May 13 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.15	4.15	4.15	3.95	3.35
Bars, H.R., Chicago	4.15	4.15	4.15	3.95	3.35
Bars, H.R., del. Philadelphia	4.405	4.405	4.405	4.502	3.816
Bars, C.F., Pittsburgh	5.20	5.20	5.20	4.925	3.95
Shapes, Std., Pittsburgh	4.10	4.10	4.10	3.85	3.25
Shapes, Std., Chicago	4.10	4.10	4.10	3.85	3.25
Shapes, del., Philadelphia	4.38	4.38	4.38	4.13	3.492
Plates, Pittsburgh	4.10	4.10	4.10	3.90	3.40
Plates, Chicago	4.10	4.10	4.10	3.90	3.40
Plates, Coatesville, Pa.	4.10	4.10	4.10	4.35	3.50
Plates, Sparrows Point, Md.	4.10	4.10	4.10	3.90	3.45
Plates, Claymont, Del.	4.10	4.10	4.10	4.35	3.65
Sheets, H.R., Pittsburgh	3.925	3.925	3.925	3.775	3.25
Sheets, H.R., Chicago	3.925	3.925	3.925	3.775	3.25
Sheets, C.R., Pittsburgh	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Chicago	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Detroit	4.975	4.975	4.975	4.775	4.20
Sheets, Galv., Pittsburgh	5.275	5.275	5.275	5.075	4.40
Strip, H.R., Pitts.	4.425	4.425	4.425	3.975-4.225	3.275
Strip, H.R., Chicago	3.925	3.925	3.925	3.725	3.25
Strip, C.R., Pittsburgh	5.45	5.45	5.45	5.10-5.80	4.375
Strip, C.R., Chicago	5.70	5.70	5.70	5.35	4.00
Strip, C.R., Detroit	5.65	5.65	5.65	5.30-6.05	4.20
Wire, Basic, Pitts.	5.525	5.525	5.525	5.225-5.475	4.15
Nails, Wire, Pittsburgh	6.55	6.55	6.55	6.35	5.15
Tin plate (1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.95	$7.75
SEMIFINISHED STEEL					
Billets, forging, Pitts (NT)	$75.50	$75.50	$75.50	$70.50	$61.00
Wire rods, 7/32-9/16" Pitts.	4.525	4.525	4.525	4.425	3.775

PIG IRON, Gross Ton	May 13 1954	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Bessemer, Pitts.	$57.00	$57.00	$57.00	$55.50	$47.0
Basic, Valley	56.00	56.00	56.00	54.50	46.0
Basic, deld. Phila.	59.66	59.66	59.66	59.25	49.3
No. 2 Fdry, Pitts.	56.50	56.50	56.50	55.00	46.5
No. 2 Fdry, Chicago	56.50	56.50	56.50	55.00	46.2
No. 2 Fdry, Valley	56.50	56.50	56.50	55.00	46.5
No. 2 Fdry, del. Phila.	60.16	60.16	60.16	59.75	49.8
No. 2 Fdry, Birm.	52.88	52.88	52.88	51.38	39.3
No. 2 Fdry(Birm.) del. Cin.	60.43	60.43	60.43	58.93	45.4
Malleable, Valley	56.50	56.50	56.50	55.00	46.5
Malleable, Chicago	56.50	56.50	56.50	55.00	46.5
Ferromanganese, Duquesne.	200.00†	200.00†	200.00†	200.00†	175.0

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pitts.	$29.50	$28.50	$26.50	$39.50	$23.0
No. 1 Heavy Melt, E. Pa.	23.00	23.00	22.00	41.00	22.7
No. 1 Heavy Melt, Chicago	30.50	30.50	27.50	36.00	21.0
No. 2 Heavy Melt, Valley	29.50	29.50	25.50	41.50	22.0
No. 1 Heavy Melt, Cleve.	28.50	26.50	22.50	39.00	18.5
No. 1 Heavy Melt, Buffalo	25.50	25.50	23.50	41.75	23.2
Rails, Rerolling, Chicago	42.00	41.00	34.50	47.50	27.7
No. 1 Cast, Chicago	38.50	38.50	38.50	41.50	27.5
COKE, Net Ton					
Beehive, Furn, Connisvl.	$14.75	$14.75	$14.75	$14.75	$14.2
Beehive, Fdry, Connisvl.	16.75	16.75	16.75	17.00	16.7
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.4

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 21.50, pigs 20.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 23.30; No. 13, 5% Si, 23.10; No. 142, 4% Cu, 24.40; No. 195, 4.5% Cu, 0.8% Si, 23.70; No. 214, 3.8% Mg, 24.40; No. 356, 7% Si, 0.3% Mg, 23.20.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Texas, in bulk. Foreign brands, 99.5%, 25.50-26.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb del.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 30.00 del. Conn. Valley, 30.125 del. Midwest; Lake 30.00 del.; Fi refined 29.75 del.

Germanium: 99.9%, $295 per lb nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $145-$150 per troy oz.

Lead: Common 13.80, chemical 13.90, co roding 13.90, St. Louis; New York basis, ad 0.20.

Lithium: 98%, $11-$14 per lb, depending quantity.

Magnesium: 99.8%, selfpalletizing pig 27.0 notched ingot 27.75, 10,000 lb or more, f.o. Freeport, Tex. For Port Newark, N. J., a Madison, Ill., add 1.20 for pig and 1.25 f ingot. Sticks, 1.3 in. diameter, 46.00, 100 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, and R 32.50; alloy M 34.50, 10,000 lb or mor f.o.b. Freeport, Tex., or Madison, Ill. Ad 1.20 for Port Newark, N. J.

Mercury: Open market, spot, New Yor $240-$245 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduce $3.40 per lb; pressed ingot $4.06 per l sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 f and larger), unpacked 60.00; 25-lb pigs 62.6 "XX" nickel shot 63.65; "F" nickel shot

DAILY NONFERROUS PRICE RECORD

	Price May 13	Last Change	Previous Price	Apr. Avg.	Mar. Avg.	May 1953 Avg.
Copper	30.00	Apr. 12	29.75-30.00	29.955	29.865	29.845
Lead	13.80	Apr. 12	13.55	13.710	12.735	12.550
Zinc	10.25	Mar. 29	9.75	10.250	9.657	11.000
Tin	93.75	May 13	93.50	96.260	92.518	97.240
Nickel	60.00	Jan. 14, 1953	56.50	60.000	60.000	60.000
Aluminum	21.50	July 15, 1953	20.50	21.500	21.500	20.500
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99 + %, del.; Magnesium 99.8%, Freeport, Tex.

ots for addition to cast iron, 60.00; prices
b. Port Colborne, Ont., including import
y. New York basis, add 0.92.
nium: $140-$150 per troy oz nom.
lladium: $21 per troy oz.
tinum: $84-$87 per troy oz from refineries.
dium: $16-$21.50 per mg radium content,
pending on quantity.
odium: $125 per troy oz.
thenium: $70-$75 per troy oz.
fenium: 99.5%, $5-$6 per lb.
dium: 16.50, carlots; 17.00 l.c.l.
ntalum: Sheet, rod $39.00 per lb; powder
3.50 per lb.
llurium: $1.75 per lb.
allium: $12.50 per lb.
n: Straits, New York, spot, 93.75; prompt,
.75.
tanium: Sponge, 99.3+%, grade A-1 ductile
.3% Fe max.) $4.72; grade A-2 (0.5% Fe
ax.) $4.46 per pound.
ngsten: Powder, 98.8%, carbon reduced,
00 lb lots $4.65 per lb f.o.b. shipping point;
s than 1000 lb $4.80; 99+% hydrogen re-
ced, $4.95. Treated ingots $6.70.
nc: Prime Western 10.25, brass special 10.50,
termediate 10.75, E. St. Louis, freight al-
wed over 0.50 per pound. High grade 11.80,
ecial high grade 11.75, die casting alloy
got 14.25, del.
rconium: Sponge $10 per lb; powder elec-
onics grade $15, flash grade $11.50.
Note: Chromium, manganese and silicon met-
s are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

uminum Ingot: Piston Alloys 21.00-22.50;
. 12 foundry alloy (No. 2 grade) 20.00-
.00, 5% silicon alloy, 0.60 Cu max., 22.50-
.50; 13 alloy, 0.60 Cu max., 22.50-23.50;
5 alloy 21.75-22.75; 108 alloy 20.50-21.50
eel deoxidizing grades, notch bars, granu-
ted or shot: Grade 1, 21.00-22.00; grade 2,
.00-21.00; grade 3, 18.50-19.50; grade 4,
.00-19.00.

ass Ingot: Red brass, No. 115, 26.00; tin
onze No. 225, 38.50, No. 245, 32.25; high-
aded tin bronze, No. 305, 31.00; No. 1
llow, No. 405, 22.25; manganese bronze No.
1, 26.75.

agnesium Alloy Ingot: AZ63A, 31.50; AZ91B,
.00; AZ91C, 31.50; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

COPPER WIRE

re, soft, f.o.b. eastern mills, 100,000 lb lots,
.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weath-
proof, 100,000 lb, 36.28; 30,000 lb, 36.53;
. 37.03. Magnet wire del., 15,000 lb or
re 41.83; l.c.l. 42.58.

LEAD

rices to jobbers f.o.b. Buffalo, Cleveland,
ttsburgh.) Sheets, full rolls, 140 sq ft or
re $19.00 per cwt; pipe, full coils $19.00
r cwt; traps and bends, list prices plus 30%.

TITANIUM

rices per lb, 100,000 lb and over, f.o.b. mill.)
eets, $15; sheared mill plate, $12; strip, $15;
re, $11; forging billets, $6; hot-rolled and
rged bars, $6.

ZINC

eets 23.00, f.o.b. mill, 36,000 lb and over.
bbon zinc in coils, 19.50-20.50, f.o.b. mill,
,000 lb and over. Plates 19.00-22.25.

ZIRCONIUM

ate $27; H.R. strip $28; C.R. strip $35;
rged or H.R. bars $27; wire, 0.015 in., 1
nt per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
eet, C.R. ...	86.5	67.5	92.5
rip, C.R. ...	92.5	70.5	98.5
ate, H.R. ...	84.5	66.5	90.5
d, Shapes ..	82.5	65.5	88.5
amless Tubes	115.5	100.5	137.5
ot, Blocks ..	....	60.0	....

ALUMINUM

(30,000 lb base; freight allowed over 499 lb)
Sheets and Circles: 2S and 3S, mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-49	33.9	...	...
0.135-0.096	12-48	34.4	...	...
0.095-0.077	12-48	35.1	32.7	37.5
0.076-0.061	12-48	35.7	32.9	37.7
0.060-0.048	12-48	36.1	33.2	38.1
0.047-0.038	12-48	36.6	33.6	38.4
0.037-0.030	12-48	37.0	34.0	39.1
0.029-0.024	12-48	37.6	34.3	39.6
0.023-0.019	12-36	38.3	35.1	40.4
0.018-0.017	12-36	39.1	35.7	41.3
0.016-0.015	12-36	40.0	36.5	42.5
0.014	12-24	41.0	37.5	43.8
0.013-0.012	12-24	42.1	38.2	44.8
0.011	12-24	43.1	39.4	46.4
0.010-0.0095	12-24	44.3	40.5	48.0
0.009-0.0085	12-24	45.6	41.9	50.0
0.008-0.0075	12-24	47.1	43.1	51.8
0.007	12-18	48.6	44.6	54.1
0.006	12-18	50.2	46.0	59.1

* 72-180 in. lengths. † 26 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in., 24-60 in. width or dia., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
2S-F, 3S-F	32.4	36.3
50S-F	33.5	37.4
4S-F	34.5	39.1
52S-F	36.2	40.9
61S-T6	37.4	41.5
24S-T4*	39.3	45.4
75S-T6*	47.1	53.7

* 24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	Round 11S-T3	Round 17S-T4	Hexagonal 11S-T3	Hexagonal 17S-T4
Drawn				
0.125	59.6	57.9	...	...
0.156-0.172	50.6	48.9	...	...
0.188	50.6	48.9	...	62.4
0.219-0.234	47.9	46.2	...	...
0.250-0.281	47.9	46.2	...	59.5
0.313	47.9	46.2	...	56.8
Cold-finished				
0.375-0.531	46.6	44.9	56.2	53.4
0.563-0.688	46.6	44.9	53.4	50.2
0.750-1.000	45.5	43.8	48.9	47.3
1.063	45.5	43.8	...	45.7
1.125-1.500	43.8	42.1	47.3	45.7
Rolled				
1.563	42.7	41.0	...	...
1.625-2.000	42.1	40.4	...	44.1
2.125-2.500	41.1	39.4	...	...
2.750-3.375	39.9	38.2	...	...

ALUMINUM

Forging Stock: Round, Class 1, 43.8-34.4, in specific lengths 36-144 in. diameters 0.375-8 in.; rectangles and squares. Class 1, 50.2-38.4 in random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 63S-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
¾	$15.05	2	$ 46.30
1	23.65	4	127.70
1¼	32.00	6	228.50
1½	38.25	8	343.80

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot-rolled AZ31, 53.000, 20,000 lb or more 0.250-in. and over, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in. 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 2S clippings 13.50; low copper clippings 13.50; mixed clippings 11.50-12.50; old sheet 11.00-11.50; borings and turnings 7.50; pistons and struts 7.50; crankcases 10.50-11.50; industrial castings 10.50-11.50.

Copper and Brass: Heavy copper and wire, No. 1 24.50; No. 2 copper 23.00; light copper 21.00; No. 1 composition red brass 18.50; No. 1 composition turnings 18.00; mixed brass turnings 13.00; new brass clippings 18.00; No. 1 brass rod turnings 14.00; light brass 12.00; heavy yellow brass 14.00; new brass rod ends 15.00; auto radiators, unsweated 14.00; cocks and faucets 16.00; brass pipe 17.00.

Lead: Heavy 10.75-11.25; battery plate 5.75-6.25; linotype and stereotype 13.00; electrotype 11.25; mixed babbitt 12.75.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 16.50-17.50.

Monel: Clippings 24.00-26.00; old sheet 22.00-24.00; turnings 16.00-18.00; rods 23.00-25.00.

Nickel: Sheets and clips 60.00-65.00; rolled anodes 60.00-65.00; turnings 40.00; rod ends 60.00-65.00.

Tin: No. 1 pewter 55.00-60.00; block tin pipe 75.00-80.00; No. 1 babbitt 45.00-50.00.

Zinc: Old zinc, 4.50; new die cast scrap, 4.00; old die cast scrap, 3.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S, 3S clippings 15.50-16.00; 51S, 52S clippings 15.50-16.00; 14S, 17S, 24S clippings 14.50-15.00; mixed clippings 14.00-15.00; old sheet 13.00-13.50; old cast 13.00-13.50; clean old cable, free of steel 15.50-16.00; borings and turnings 13.50-14.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 26.75-27.00; No. 2 copper 25.25-25.50; light copper 23.75-24.00; refinery brass (60% copper) per dry copper content 22.25-22.50; auto radiators, 16.25.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 26.75-27.00; No. 2 copper 25.25-25.50; light copper 23.75-24.00; No. 1 composition borings 19.50-20.00; No. 1 composition solids 20.00-20.50; heavy yellow brass solids 15.50-16.00; yellow brass turnings 14.75-15.00; radiators 16.50.

PLATING MATERIALS

(F.o.b. shipping points, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.75 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 2000-5000 lb; electrodeposited 39.78, cast 42.04, 5000-10,000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.125; 200-499 lb $1.11; 500-999 lb $1.105; 1000 lb or more $1.10.

Zinc: Bar 18.50, bar or flat top 17.50, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 71.5; 100-600 lb 57.2; 700-1900 lb 54.7; 2000-9900 lb 53; 10,000 lb or more 51.9.

Stannous Chloride (Anhydrous): Less than 50 lb $1.576; 50 lb $1.236; 100-300 lb $1.086; 400-900 lb $1.061; 1000-1900 lb $1.037; 200-4900 lb $1; 5000-19,000 lb 93.9; 20,000 lb and over 87.8.

Stannous Sulphate: Less than 50 lb $1.275; 50 lb 97.5; 100-1900 lb 95.5; 2000 lb and over 93.5.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb. and over 52.30.

RASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
pper	48.38b	45.98c	....	48.44	26.000	26.000	25.250
llow Brass	41.72	33.50d	42.26	44.63	19.750	19.500	18.000
d Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
w Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
val Brass	45.76	40.07	52.80	48.92	18.250	18.000	17.500
mmercial Bronze, 90% ..	46.95	46.89	47.49	49.51	23.875	23.625	23.125
ckel Silver, 10%	55.36	59.43g	57.69	....	23.625	23.375	11.813
osphor Bronze, A, 5% ..	66.58	67.08	67.08	68.23	26.125	25.875	24.875
icon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
nganese Bronze	49.48	43.62	54.06	....	18.250	18.000	17.500
ntz Metal	43.96	39.77	....	....	18.625	18.375	17.875

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping int. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Nonferrous Metals

National stockpilers are in a tough spot. Each metal has a special philosophy of how the stockpile should operate and what it should accomplish

BEING all things to all men is at best a trying and thankless task, but that's what is expected of the nation's stockpilers.

With a new look being taken at the "new look" defense program, stockpile needs are also undergoing reappraisal. Completion of this project is presently scheduled toward the end of summer. The metals industry apparently expects minor miracles to stem from "judicious use" of the stockpiling authority. It's apt to be disappointed.

Who Wants What—The stockpile plan, to fulfill all that's expected of it, would have to be a hydra-headed monster, which is just what it may turn out to be eventually. Depending on how it's faring economically, each metal has a special philosophy of how the stockpile should operate and what it should accomplish.

To some producers, smart stockpiling means accumulation of stocks in hard times for disposal when demand looms large, rather than buying during shortage periods which usually accompany the demand boom. To others it means bailing the industry out of its economic straits. Lead and zinc fit into one or the other of the above categories. In metals where there's still a supply pinch, producers and users wish accumulations to be a lighter burden so they can nourish civilian markets. Nickel is an example; last year defense and stockpile took about 50 per cent of supply.

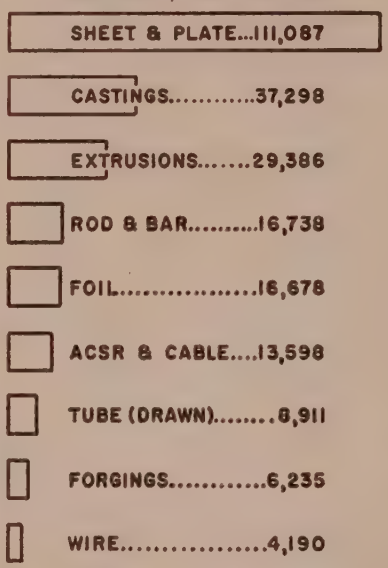
Pleasant Reductions—Copper producers are only too happy to see 100,000 tons of Chilean copper swallowed by the U. S. government but have no pressing problem at the moment. Present demand is higher than production, allowing pleasant reductions in producers' stocks, which were growing unwieldy at 125,000 tons. There's enough tin stashed away already to carry our production machine through several wars, but demands for keeping the government smelter open beyond next month are still heard.

Aluminum producers less than a year ago were agitating for a stockpile stretchout. They've been remarkably quiet on this score since the market swung into balance. With current expansions there should be no worry on availability of aluminum for the government cache, and the third-round expansion argument becomes more academic daily. In magnesium the story is in bolder relief—all but one of the government producing plants have been shut down because of adequate stocks.

Broadened Scope—Long-term supply contracts are directing healthy tonnages to the strategic reserve, augmented by spot purchases as necessary. But it isn't as easy as all that. Domestic and international politics must enter into stockpilers' decisions. It's ABC to politicians that mine shutdowns lose miners' votes, reductions in purchases abroad lose friends abroad, sacrificing civilian needs can alienate businessmen.

These factors must be considered, as well as many others. The stockpile concept has been broadened in scope considerably since its inception.

ALUMINUM "PIE"
How It's Cut
(First Quarter, 1954—Net Tons)



Source: The Aluminum Association

Outlook Brightens

Things are looking up in lead and zinc. St. Joseph Lead Co., the nation's largest mine producer of lead and a sizable factor in zinc production, believes the last three quarters of this year will be better than the first quarter. Clinton H. Crane, St. Joseph chairman, told stockholders the lead situation appears to be in balance, with producers' stocks not overly high and consumers' stocks on the low side. In zinc he painted a picture much less bright: "Producers' stocks are excessive, and the price is so low that very few producers are operating in the black."

Zinc Stocks Fall Slightly

Statistically, zinc showed a slight improvement in April as stocks edged downward for the first time in 11 months but not enough to matter. May showing is not likely to be much better. In April, production of 70,233 tons compared with shipments of 70,525 tons. Stocks fell 300 tons to 200,808 tons and unfilled orders slipped sharply to 31,702 tons.

Aluminum Shipments Rise

Shipments of aluminum products continued their upsurge in March led by a sharp increase in sheet and plate, extrusions, tube and cable. Lesser improvements were registered by foil, nonconductor wire, and permanent mold and diecasting. Decreases came in rod and bar, forgings and sand castings. Less than 1 per cent of aluminum castings are now produced by sand casting methods.

Market Memos

- When nickel stockpiling is completed between 1960 and 1962, total annual production will be at a level of about 500 million pounds. There is a possibility civilian supplies will improve in the third quarter if defense take slips as expected.
- Aluminum cable adapter that allows interchangeable use of copper and aluminum electrical conductors in switch and control equipment has been developed by Thomas & Betts, Elizabeth, N. J. It's made in straight and right angle types for No. 4 and No. 2 stranded aluminum cable. Tin-plated copper alloy is the material used.
- Aluminum setasides in the third quarter will drop 16,000 tons from the second quarter. The 67,000 tons set aside will be 15 per cent of total supply compared to 19 per cent in the second quarter.

new application . . .

Vancoram Grainal

cuts conditioning costs, reduces rejects, steps up production of stainless steels

Stainless steels—particularly the higher alloy grades—are prone to develop cracks and other surface defects during rolling or forging.

Removal of these defects by chipping, scarfing, grinding or trimming means loss of valuable metal and higher unit costs.

A growing number of steelmakers are finding the answer to this problem in Vancoram GRAINAL Alloys, the same multiple-element alloys widely used in the making of boron steels. Field reports indicate that the addition of GRAINAL appreciably improves the steel's hot-working characteristics, resulting in lower conditioning costs and increased production.

Your nearest Vanadium Corporation office will welcome the opportunity to give you additional details on this new application for GRAINAL Alloys.

VANADIUM CORPORATION OF AMERICA

420 Lexington Avenue, New York 17, N. Y.

DETROIT • CHICAGO • CLEVELAND • PITTSBURGH

Producers of alloys VANCORAM BRAND metals and chemicals

STEEL PRICES

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on page 143. Key to footnotes, page 145.

SEMIFINISHED

INGOTS, Carbon Forging (NT)
Fontana,Calif. K1 ....$86.00
Munhall,Pa. U5 .....59.00

INGOTS, Alloy (NT)
Detroit R7 .....$63.00
Fontana,Calif. K1 ....88.00
Midland,Pa. C18 .....62.00
Munhall,Pa. U5 .....62.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Aliquippa,Pa. J5 ....$62.00
Bessemer,Pa. U5 .....62.00
Clairton,Pa. U5 .....62.00
Ensley,Ala. T2 .....62.00
Fairfield,Ala. T2 .....62.00
Fontana,Calif. K1 ....70.00
Gary,Ind. U5 .....62.00
Johnstown,Pa. B2 .....62.00
Lackawanna,N.Y. B2..62.00
Munhall,Pa. U5 .....62.00
So.Chicago,Ill. U5 ....62.00
So.Duquesne,Pa. U5 ..62.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$75.50
Bessemer,Pa. U5 .....75.50
Buffalo R2 .....75.50
Clairton,Pa. U5 .....75.50
Cleveland R2 .....75.50
Conshohocken,Pa. A3 ..80.50
Detroit R7 .....78.50
Ensley,Ala. T2 .....75.50
Fairfield,Ala. T2 .....75.50
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....75.50
Geneva,Utah C11 ....75.50
Houston S5 .....83.50
Johnstown,Pa. B2 ....75.50
Lackawanna,N.Y. B2..75.50
LosAngeles B3 .....85.00
Munhall,Pa. U5 .....75.50
Seattle B3 .....89.00
So.Chicago R2,U5,W14.75.50
So.Duquesne,Pa. U5 ..75.50
So.SanFrancisco B3 ...85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$82.00
Buffalo R2 .....82.00
Canton,O. R2, T7 ....82.00
Conshohocken,Pa. A3..89.00
Detroit R7 .....84.00
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....82.00
Houston S5 .....90.00
Ind.Harbor,Ind. Y1 ...82.00
Johnstown,Pa. B2 ....82.00
Lackawanna,N.Y. B2 ..82.00
LosAngeles B3 .....102.00
Massillon,O. R2 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
So.Chicago R2,U5,W14.82.00
So.Duquesne,Pa. U5 ..82.00
Struthers,O. Y1 .....82.00
Warren,O. C17 .....82.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$92.50
Canton,O. R2 .....92.50
Cleveland R2 .....92.50
Fontana,Calif. K1 ....113.50
Gary,Ind. U5 .....92.50
Massillon,O. R2 .....92.50
So.Chicago,Ill. R2 ....92.50
So.Duquesne,Pa. U5 ..92.50

SHEET BAR (NT)
Fontana,Calif. K1 ...$93.18

SKELP
Aliquippa,Pa. J5 .....3.85
Munhall,Pa. U5 .....3.75
Warren,O. R2 .....3.75
Youngstown R2, U5 ....3.75

WIRE RODS
AlabamaCity,Ala. R2 ..4.525
Aliquippa,Pa. J5 ....4.525
Alton,Ill. L1 .....4.70
Buffalo W12 .....4.525
Cleveland A7 .....4.525
Donora,Pa. A7 .....4.525
Fairfield,Ala. T2 ....4.525
Fontana,Calif. K1 ....5.325
Houston S5 .....4.925
Johnstown,Pa. B2 ....4.525
Joliet,Ill. A7 .....4.525
KansasCity,Mo. S5 ....4.865
Kokomo,Ind. C16 ....4.625
LosAngeles B3 .....5.325
Minnequa,Colo. C10 ..4.775
Monessen,Pa. P7 ....4.525
No.Tonawanda,N.Y.B11 4.525
Pittsburg,Calif. C11 ..5.175
Portsmouth P12 .....4.525
Roebling,N.J. R5 ....4.625
So.Chicago,Ill. R2 ....4.525
SparrowsPoint,Md. B2..4.625
Sterling,Ill.(1) N15 ...4.525
Struthers,O. Y1 .....4.525
Torrance,Calif. C11 ...5.325
Worcester,Mass. A7 ...4.825

STRUCTURALS

Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ...4.10
Aliquippa,Pa. J5 .....4.10
Bessemer,Ala. T2 .....4.10
Bethlehem,Pa. B2 .....4.15
Clairton,Pa. U5 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 ....4.75
Gary,Ind. U5 .....4.10
Geneva,Utah C11 .....4.10
Houston S5 .....4.50
Ind.Harbor,Ind. I-2 ...4.10
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.70
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.80
Minnequa,Colo. C10 ....4.55
Munhall,Pa. U5 .....4.10
Niles,Calif. P1 .....4.80
Phoenixville,Pa. P4 ....4.15
Seattle B3 .....4.85
So.Chicago,Ill. U5, W14.4.10
So.SanFrancisco B3 ....4.75
Torrance,Calif. C11 ....4.80
Weirton,W.Va. W6 ....4.10

Wide Flange
Bethlehem,Pa. B2 .....4.15
Clairton,Pa. U5 .....4.10
Fontana,Calif. K1 ....5.10
Lackawanna,N.Y. B2 ..4.15
Munhall,Pa. U5 .....4.10
Phoenixville,Pa. P4 ....4.15
So.Chicago,Ill. U5 ....4.10

Alloy Stand. Shapes
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 ....6.40
Gary,Ind. U5 .....5.00
Munhall,Pa. U5 .....5.00
So.Chicago,Ill. U5 ....5.00

H.S., L. A. Stand. Shapes
Aliquippa,Pa. J5 .....6.175
Bessemer,Ala. T2 ....6.175
Bethlehem,Pa. B2 ....6.20
Clairton,Pa. U5 .....6.175
Fairfield,Ala. T2 .....6.175
Fontana,Calif. K1 ....6.825
Gary,Ind. U5 .....6.175
Geneva,Utah C11 ....6.175
Ind.Harbor,Ind. I-2 ...6.175
Ind.Harbor,Ind. Y1 ...6.675
Johnstown,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ..6.20
LosAngeles B3 .....6.85
Munhall,Pa. U5 .....6.175
Seattle B3 .....6.90
So.Chicago,Ill. U5,W14.6.175
So.SanFrancisco B3 ....6.80
Struthers,O. Y1 .....6.675

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....6.20
Lackawanna,N.Y. B2...6.20
Munhall,Pa. U5 .....6.125
So.Chicago,Ill. U5 ....6.125

PILING

Bearing Piles
Munhall,Pa. U5 .....4.10
So.Chicago,Ill. U5 ....4.10

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ...4.925
Lackawanna,N.Y. B2 ..4.925
Munhall,Pa. U5 .....4.925
So.Chicago,Ill. U5 ....4.925

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..4.10
Aliquippa,Pa. J5 .....4.10
Ashland,Ky. (15) A10 ..4.10
Bessemer,Ala. T2 .....4.10
Clairton,Pa. U5 .....4.10
Claymont,Del. C22 ....4.10
Cleveland J5, R2 .....4.10
Coatesville,Pa. L7 ....4.10
Conshohocken,Pa. A3 ..4.10
Ecorse,Mich. G5 .....4.25
Fairfield,Ala. T2 .....4.10
Fontana,Calif.(30) K1 .4.75
Gary,Ind. U5 .....4.10
Geneva,Utah C11 .....4.10
GraniteCity,Ill. G4 ....4.30
Harrisburg,Pa. C5 ....4.10
Houston S5 .....4.50
Ind.Harbor,Ind. I-2, Y1.4.10
Johnstown,Pa. B2 .....4.10
Lackawanna,N.Y. B2 ...4.10
LoneStar,Tex. L6 .....4.40
Minnequa,Colo. C10 ....4.95
Munhall,Pa. U5 .....4.10
Pittsburgh J5 .....4.10
Riverdale,Ill. A1 .....4.10
Seattle B3 .....5.00
Sharon,Pa. S3 .....4.10
So.Chicago,Ill. U5, W14 4.10
SparrowsPoint,Md. B2 ..4.10
Steubenville,O. W10 ....4.10
Warren,O. R2 .....4.10
Weirton,W.Va. W6 ....4.10
Youngstown R2, U5, Y1.4.10

PLATES, Carbon Abras. Resist.
Fontana,Calif. K1 .....5.90
Geneva,Utah C11 .....5.25

PLATES, Wrought Iron
Economy,Pa. B14 .....9.30

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.25
Bessemer,Ala. T2 .....6.25
Clairton,Pa. U5 .....6.25
Cleveland J5 .....6.25
Conshohocken,Pa. A3 ..6.25
Ecorse,Mich. G5 .....6.40
Fairfield,Ala. T2 .....6.25
Fontana,Calif.(30) K1 ..6.95
Gary,Ind. U5 .....6.25
Geneva,Utah C11 .....6.25
Ind.Harbor,Ind. I-2 ...6.25
Ind.Harbor,Ind. Y1 ....6.75
Johnstown,Pa. B2 .....6.25
Lackawanna,N.Y. B2 ...6.25
Munhall,Pa. U5 .....6.25
Pittsburgh J5 .....6.25
Seattle B3 .....7.15
Sharon,Pa. S3 .....6.25
So.Chicago,Ill. U5, W14.6.25
SparrowsPoint,Md. B2 ..6.25
Youngstown U5 .....6.25
Youngstown Y1 .....6.75

PLATES, Alloy
Claymont,Del. C22 ....5.55
Coatesville,Pa. L7 ....5.55
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.55
Johnstown,Pa. B2 .....5.55
Munhall,Pa. U5 .....5.55
Sharon,Pa. S3 .....5.55
So.Chicago,Ill. U5, W14.5.55
SparrowsPoint,Md. B2 ..5.55

FLOOR PLATES
Cleveland J5 .....5.15
Conshohocken,Pa. A3 ...5.15
Harrisburg,Pa. C5 .....5.15
Ind.Harbor,Ind. I-2 ...5.15
Munhall,Pa. U5 .....5.15
So.Chicago,Ill. U5 .....5.15

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..4.35
Ashland l.c.l.(15) A10..4.85
Cleveland c.l. R2 .....4.70
Warren,O. c.l. R2 ....4.70

BARS

BARS, Hot-Rolled Carbon
Aliquippa,Pa. J5 .....4.15
Alton,Ill. L1 .....4.35
Atlanta,Ga. A11 .....4.35
Bessemer,Ala. T2 .....4.15
Birmingham,Ala. C15 ..4.15
Buffalo(31) R2 .....4.18
Clairton,Pa. U5 .....4.15
Cleveland(31) R2 .....4.21
Detroit R7 .....4.30
Ecorse,Mich. G5 .....4.30
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.15
Fairless,Pa. U5 .....4.30
Fontana,Calif. K1 .....4.85
Gary,Ind. U5 .....4.15
Gadsden,Ala.(31) R2 ...4.18
Houston S5 .....4.55
Ind.Harbor,Ind. I-2, Y1.4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.75
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.85
Milton,Pa. M18 .....4.15
Minnequa,Colo. C10 ....4.60
Niles,Calif. P1 .....4.85
N.Tonawanda,N.Y. B11.4.15
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 .....4.15
Portland,Oreg. O4 .....4.90
Seattle B3, N14, P23....4.90
So.Chicago U5, W14 ...4.15
Chicago(31) R2 .....4.22
So.Duquesne,Pa. U5 ...4.15
So.SanFran.,Calif. B3 ..4.90
Sterling,Ill. (1) N15 ...4.15
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....4.85
Weirton,W.Va. W6 ....4.15
Youngstown U5 .....4.15
Youngstown(31) R2 ....4.20

Bars, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.875
Buffalo R2 .....4.875
Canton,O. R2, T7 ....4.875
Clairton,Pa. U5 .....4.875
Detroit R7 .....4.975
Ecorse,Mich. G5 .....5.025
Fairless,Pa. U5 .....5.025
Fontana,Calif. K1 ....5.925
Gary,Ind. U5 .....4.875
Houston S5 .....5.275
Ind.Harbor,Ind. I-2,Y1.4.875
Johnstown,Pa. B2 ....4.875
KansasCity,Mo. S5 ....5.475
Lackawanna,N.Y. B2 ..4.875
LosAngeles B3 .....5.925
Massillon,O. R2 .....4.875
Midland,Pa. C18 .....4.875
So.Chicago R2,U5,W14.4.875
So.Duquesne,Pa. U5 ...4.875
Struthers,O. Y1 .....4.875
Warren,O. C17 .....4.875
Youngstown U5 .....4.875

BARS & SMALL SHAPES, H.R.
High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.225
Bessemer,Ala. T2 .....6.225
Bethlehem,Pa. B2 ....6.225
Clairton,Pa. U5 .....6.225
Ecorse,Mich. G5 .....6.375
Fairfield,Ala. T2 .....6.225
Fontana,Calif. K1 ....7.475
Gary,Ind. U5 .....6.225
Ind.Harb.Ind. Y1 ....6.725
Ind.Harb.,Ind. I-2 ....6.225
Johnstown,Pa. B2 ....6.225
Lackawanna,N.Y. B2 ..6.225
LosAngeles B3 .....6.925
Pittsburgh J5 .....6.225
Seattle B3 .....6.975
So.Chicago W14 .....6.225
So.Duquesne,Pa. U5 ...6.225
So.SanFrancisco B3 ...6.975
Struthers,O. Y1 .....6.725
Youngstown U5 .....6.225

BAR SIZE ANGLES;H.R.CARBON
Bethlehem,Pa. B2 .....4.35

BAR SIZE ANGLES: S. Shapes
Aliquippa,Pa. J5 .....4.15
Atlanta A11 .....4.35
Niles,Calif. P1 .....4.85
SanFrancisco S7 .....5.10

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 ....5.925
Gary,Ind. U5 .....5.00
Houston S5 .....5.60
KansasCity S5 .....5.60
Youngstown U5 .....5.00

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....5.20
BeaverFalls,Pa. M12,R2.5.20
Buffalo B5 .....5.25
Camden,N.J. P13 .....5.65
Carnegie,Pa. C12 .....5.20
Chicago W18 .....5.20
Cleveland A7, C20 ....5.20
Detroit P17, R7 .....5.35
Detroit B5 .....5.40
Donora,Pa. A7 .....5.20
Elyria,O. W8 .....5.20
FranklinPark,Ill. N5 ..5.20
Gary,Ind. R2 .....5.20
GreenBay,Wis. F7 ....5.20
Hammond,Ind. L2, M13.5.20
Hartford,Conn. R2 .....5.75
Harvey,Ill. B5 .....5.20
LosAngeles R2, S30 ....6.65
Mansfield,Mass. B5 ....5.75
Massillon,O. R2, R8 ....5.20
Monaca,Pa. S17 .....5.20
Newark,N.J. W18 .....5.65
NewCastle,Pa.(17) B4 ..5.20
Pittsburgh J5 .....5.20
Plymouth,Mich. P5 ....5.45
Putnam,Conn. W18 ....5.75
Readville,Mass. C14 ....5.75
St.Louis,Mo. M5 .....5.50
So.Chicago,Ill. W14 ....5.20
SpringCity,Pa. K3 .....5.65
Struthers,O. Y1 .....5.20
Waukegan,Ill. A7 .....5.20
Worcester,Mass. W19 ..6.10
Youngstown F3, Y1 ....5.20

BARS, Cold-Finished Alloy
(Turned and Ground)
Cumberland,Md.(5) C19.4.45

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....6.325
BeaverFalls,Pa. M12 ..6.325
Bethlehem,Pa. B2 ....6.325
Buffalo B5 .....6.325
Camden,N.J. P13 .....6.50
Canton,O. R2, T7 ....6.325
Carnegie,Pa. C12 .....6.3
Chicago W18 .....6.3
Cleveland A7, C20 ....6.3
Detroit R7 .....6.4
Detroit P17 .....6.4
Detroit B5 .....6.5
Donora,Pa. A7 .....6.3
Elyria,O. W8 .....6.3
Gary,Ind. R2 .....6.3
Hammond,Ind. L2,M13.6.3
Hartford,Conn. R2 ....6.7
Harvey,Ill. B5 .....6.3
Lackawanna,N.Y. B2 ..6.3
Mansfield,Mass. B5 ..6.7
Massillon,O. R2, R8 ..6.3
Midland,Pa. C18 .....6.3
Monaca,Pa. S17 .....6.3
Newark,N.J. W18 .....6.
Plymouth,Mich. P5 ....6.5
So.Chicago,Ill. R2,W14.6.3
SpringCity,Pa. K3 .....6.
Struthers,O. Y1 .....6.3
Warren,O. C17 .....6.3
Waukegan,Ill. A7 .....6.3
Worcester,Mass. A7 ....6.6
Youngstown F3, Y1 ...6.3

BARS, Reinforcing (Fabricator
AlabamaCity,Ala. R2 ..4.
Atlanta A11 .....4.
Birmingham,Ala. C15 ..4.
Buffalo R2 .....4.
Cleveland R2 .....4.
Emeryville,Calif. J7 ....4.
Fairfield,Ala. T2 .....4.
Fairless,Pa. U5 .....4.
Fontana,Calif. K1 .....4.
Gary,Ind. U5 .....4.
Houston S5 .....4.
Ind.Harbor,Ind. I-2, Y1.4.
Johnstown,Pa. B2 .....4.
KansasCity,Mo. S5 ....4.
Lackawanna,N.Y. B2 ..4.
LosAngeles B3 .....4.
Milton,Pa. M18 .....4.
Minnequa,Colo. C10 ....4.
Niles,Calif. P1 .....4.
Pittsburg,Calif. C11 ....4.
Pittsburgh J5 .....4.
SandSprings,Okla. S5 ..5.
Seattle B3, N14, P23...4.
So.Chicago,Ill. R2 .....4.
So.Duquesne,Pa. U5 ....4.
So.SanFrancisco B3 ....4.
SparrowsPoint,Md. B2 ..4.
Sterling,Ill.(1) N15 ....4.
Struthers,O. Y1 4
Torrance,Calif. C11 4
Youngstown R2, U5 4

BARS, Reinforcing
(Fabricated; to consumers)
Johnstown, ¼-1" B2 ...5
KansasCity S5 6
LosAngeles B3 5
Marion,O. P11 5
Seattle N14 5
Seattle B3, P23 5
So.SanFrancisco B3 5
SparrowsPt. ½-1" B2 ..5
Williamsport,Pa. S19 ...5

RAIL STEEL BARS
Avis,Pa.(3) J8 .....
ChicagoHts.(3) C2, I-2..
ChicagoHts.(4) C2, I-2..
Ft.Worth,Tex.(26) T4 ..
Franklin,Pa.(3) F5 ....
Franklin,Pa.(4) F5 ....
Marion,O.(3) P11 .....
Moline,Ill.(3) R2 .....
Tonawanda(3,4) B12 ...
Williamsport,Pa.(3) S19..
Williamsport,Pa.(4) S19..

BARS, Wrought Iron
Economy,Pa.(S.R.)B14 1
Economy,Pa.(D.R.)B14 1
Economy(Staybolt) B14 1
McK.Rks.(S.R.) L5 ...1
McK.Rks.(D.R.) L5 ...1
McK.Rks.(Staybolt) L5.1

SHEETS

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ..3
Allenport,Pa. P7 3
Ashland,Ky.(8) A10 ...3
Cleveland J5, R2 3
Conshohocken,Pa. A3 ..3
Detroit M1 4
Ecorse,Mich. G5 3
Fairfield,Ala. T2 3
Fairless,Pa. U5 3
Fontana,Calif. K1 .....
Gary,Ind. U5 3
Geneva,Utah C11 .....
GraniteCity,Ill. G4 ....
Ind.Harbor,Ind. I-2, Y1.3
Irvin,Pa. U5 3

komo,Ind. C16 ....4.025
kawanna,N.Y. B2 .3.925
nhall,Pa. U5 .....3.925
wport,Ky. N9 .....3.925
es,O. N12 .....5.175
tsburg,Calif. C11 ...4.625
tsburgh J5 .....3.925
rtsmouth,O. P12 ....3.925
erdale,Ill. A1 .....3.925
iron,Pa. S3 .....3.925
Chicago,Ill. W14 ...3.925
arrowsPoint,Md. B2.3.925
ubenville,O. W10 ...3.925
rance,Calif. C11 ...4.625
rren,O. R2 .....3.925
irton,W.Va. W6 ...3.925
ungstown U5, Y1 ...3.925

EETS H.R. (19 gage)
abamaCity,Ala. R2 .5.225
ver,O. R1 .....5.05
komo,Ind. C16 ....5.025
nsfield,O. E6 .....5.05
es,O. N12 .....4.775
rance,Calif. C11 ....5.875

EETS, H.R. (14 ga. heavier)
High-Strength Low-Alloy
eveland J5, R2 .....5.90
nshohocken,Pa. A3 ..5.90
orse,Mich. G5 .....6.05
irfield,Ala. T2 .....5.90
irless,Pa. U5 .....5.95
ntana,Calif. K1 ....6.675
ry,Ind. U5 .....5.90
i.Harbor,Ind. I-2 ...5.90
i.Harbor,Ind. Y1 ...6.40
in,Pa. U5 .....5.90
ckawanna(35) B2 ...5.90
nhall,Pa. U5 .....5.90
tsburgh J5 .....5.90
aron,Pa. S3 .....5.90
Chicago,Ill. U5 .....5.90
arrowsPoint (36) B2 ..5.90
arren, O. R2 .....5.90
irton,W.Va. W6 ....5.90
ungstown U5 .....5.90
ungstown Y1 .....6.40

EETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)
hland,Ky.(8) A10 ..4.175
eveland R2 .....4.525
d.Harbor,Ind. I-2 ..4.175
arren,O. R2 .....4.525

EETS, Cold-Rolled Steel
(Commercial Quality)
lenport,Pa. P7 .....4.775
eveland J5, R2 .....4.775
orse,Mich. G5 .....4.925
irfield,Ala. T2 .....4.775
irless,Pa. U5 .....4.825
llansbee,W.Va. F4 ..4.775
ntana,Calif. K1 ....5.875
ry,Ind. U5 .....4.775
raniteCity,Ill. G4 ....4.975
d.Harbor,Ind. I-2,Y1.4.775
in,Pa. U5 .....4.775
ckawanna,N.Y. B2..4.775
ddletown,O. A10 ....4.775
tsburg,Calif. C11 ...5.725
tsburgh J5 .....4.775
rtsmouth,O. P12 ....4.775
arrowsPoint,Md. B2..4.775
ubenville,O. W10 ...4.775
arren,O. R2 .....4.775
irton,W.Va. W6 ....4.775
ungstown Y1 .....4.775

EETS, Cold-Rolled
High-Strength Low-Alloy
eveland J5, R2 .....7.225
orse,Mich. G5 .....7.375
irless,Pa. U5 .....7.275
ntana,Calif. K1 ....8.275
ry,Ind. U5 .....7.225
ianaHarbor,Ind. Y1.7.725
in,Pa. U5 .....7.225
ckawanna(37) B2 ..7.225
tsburgh J5 .....7.225
arrowsPoint (38) B2.7.225
arren,O. R2 .....7.225
irton,W.Va. W6 ....7.225
ungstown Y1 .....7.275

EETS, Cold-Rolled Ingot Iron
veland R2 .....5.375
ddletown,O. A10 ....5.275
rren,O. R2 .....5.375

EETS, Culvert	Cu Alloy	Cu Fe
hland,Ky. A10	.6.325	....
nton,O. R2	..6.075	6.675
irfield T2	....6.075	6.325
ry,Ind. U5	..6.075	6.325
i.Harbor I-2	..6.075	6.325
in,Pa. U5	..6.075	6.325
komo,Ind. C16	6.175	....
rtinsFry.,O.W10	6.075	....
ts.,Calif. C11	..6.825	....
arrowsPt. B2	..6.075	....
rance,Cal. C11	7.075	....

EETS, Culvert	Pure Iron
hland,Ky. A10	....6.575
irfield,Ala. T2	....6.325
rtinsFerry,O. W10	..6.325

SHEETS, Gal'd No. 10 Steel
AlabamaCity,Ala. R2 ..5.275
Ashland,Ky(8) A10 ...5.275
Canton,O. R2 .....5.275
Delphos,O. N16 .....5.775
Dover,O. R1 .....5.275
Fairfield, Ala. T2 ....5.275†
Gary,Ind. U5 .....5.275†
GraniteCity, Ill. G4 ....5.475
Ind.Harbor,Ind. I-2 ...5.275
Irvin,Pa. U5 .....5.275†
Kokomo, Ind. C16 ....5.375†
MartinsFerry,O. W10..5.275
Niles,O. N12 .....5.275
Pittsburg,Calif. C11 ..6.025†
SparrowsPoint,Md. B2.5.275
Steubenville,O. W10 ..5.275
Torrance,Calif. C11 ..6.275†
Weirton,W.Va. W6 ....5.275

† Based on 5c zinc

SHEETS, Galvanized No. 10
High-Strength Low-Alloy
Irvin,Pa. U5 .....7.925
SparrowsPoint(39) B2..8.075

SHEETS, Galvanized Ingot Iron
No. 10 flat
Ashland,Ky. (8) A10 ..5.525
Canton,O. R2 .....6.025

SHEETS, Galvannealed Steel
Canton,O. R2 .....5.825
Irvin,Pa. U5 .....5.825†
Kokomo,Ind. C16 ....5.925†
Niles,O. N12 .....5.825

† Based on 5c zinc

SHEETS, ZINCGRIP Steel
Butler,Pa. A10 .....5.275
Middletown,O. A10 ....5.275

SHEETS, ZINCGRIP Ingot Iron
Butler,Pa. A10 .....5.575
Middletown,O. A10 ....5.575

SHEETS, Electrogalvanized
Cleveland R2 (28) 6.125
Niles,O. R2 (28) 6.125
Weirton,W.Va. W6 ....5.975

SHEETS, ALUMINIZED
Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron
Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.175
Gary,Ind. U5 .....5.175
GraniteCity,Ill. G4 ....5.375
Ind.Harbor,Ind. I-2 ..5.175
Irvin,Pa. U5 .....5.175
Middletown,O. A10 ....5.175
Niles,O. N12 .....6.525
Youngstown Y1 .....5.175

BLUED STOCK, 29 ga.
Follansbee,W.Va. F4 ...7.20
Follansbee(23) F4 .....6.425
Yorkville,O. W10 .....7.20

SHEETS, Long Terne Steel
(Commercial Quality)
BeechBott'm,W.Va.W10 5.675
Gary,Ind. U5 .....5.675
Mansfield,O. E6 .....5.675
Middletown,O. A10 ....5.675
Niles,O. N12 .....5.675
Weirton,W.Va. W6 ....5.675

SHEETS, Long Terne, Ingot Iron
Middletown,O. A10 ....6.075

SHEETS, Well Casing
Fontana,Calif. K1 ....6.20

STRIP

STRIP, Hot-Rolled Carbon
Ala.City,Ala.(27) R2 ..3.925
Allenport,Pa. P7 .....3.925
Alton,Ill. L1 .....4.10
Ashland,Ky.(8) A10 ..3.925
Atlanta A11 .....4.125
Bessemer,Ala. T2 .....3.925
Birmingham C15 .....3.925
Bridgeport,Conn.(10)S15 3.95
Buffalo(27) R2 .....3.925
Carnegie,Pa. S18 .....4.425
Conshohocken,Pa. A3 ..4.05
Detroit M1 .....4.075
Ecorse,Mich. G5 .....4.075
Fairfield,Ala. T2 ....3.925
Fontana,Calif. K1 ....4.70
Gary,Ind. U5 .....3.925
Houston,Tex. S5 .....4.325
Ind.Harbor,Ind. I-2,Y1.3.925
Johnstown,Pa.(25) B2..3.925
KansasCity,Mo.(9) S5 .4.525
Lackw'na,N.Y.(25) B2.3.925
LosAngeles(25) B3 ....4.675
Milton,Pa. M18 .....3.925
Minnequa,Colo. C10 ....5.025
NewBritain(10) S15 ....4.15
N.Tonawanda,N.Y. B11.3.925
Pittsburg,Calif. C11 ..4.675
Portsmouth,O. P12 ....3.925
Riverdale,Ill. A1 .....3.925
SanFrancisco S7 .....5.10
Seattle(25) B3, P23 ..4.925
Seattle N14 .....4.925
Sharon,Pa. S3 .....3.925
So.Chicago,Ill. W14 ..3.925
So.SanFrancisco(25)B3 4.675
SparrowsPoint,Md. B2.3.925
Torrance,Calif. C11 ....4.675
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ....3.925
Youngstown U5 .....3.925

STRIP, Hot-Rolled Alloy
Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.40
Fontana,Calif. K1 ....7.80
Gary,Ind. U5 .....6.40
Houston,Tex. S5 .....6.80
KansasCity,Mo. S5 ....7.00
LosAngeles B3 .....7.60
NewBritn.,Conn.(10)S15 6.45
Sharon,Pa. S3 .....6.40
So.Chicago W14 .....6.40
Youngstown U5 .....6.40

STRIP, Hot-Rolled
High-Strength Low-Alloy
Bessemer,Ala. T2 .....5.95
Conshohocken,Pa. A3 ..5.90
Ecorse,Mich. G5 .....6.10
Fairfield,Ala. T2 .....5.95
Fontana,Calif. K1 .....7.05
Gary,Ind. U5 .....5.95
Ind.Harbor,Ind. I-2 ....5.95
Ind.Harbor,Ind. Y1 ....6.45
Lackawanna,N.Y. B2 ..6.00
LosAngeles(25) B3 ....6.70
Seattle(25) B3, P23 ..6.95
Sharon,Pa. S3 .....5.95
So.SanFrancisco(25) B3.6.70
SparrowsPoint,Md. B2 ..6.00
Warren,O. R2 .....5.95
Weirton,W.Va. W6 ....5.95
Youngstown Y1 .....6.45
Youngstown U5 .....5.95

STRIP, Hot-Rolled Ingot Iron
Ashland,Ky.(8) A10 ..4.175
Warren,O. R2 .....4.525

STRIP, Cold-Rolled Carbon
Anderson,Ind. G5 .....5.45
Baltimore T6 .....5.60
Bridgeport,Conn.(10) S15.5.45
Cleveland A7, J5 ....5.45
Dearborn,Mich. D3 ....5.60
Detroit M1 .....5.60
Detroit D2, P20 .....5.65
Dover,O. G6 .....5.45
Ecorse,Mich. G5 .....5.60
Follansbee,W.Va. F4 ..5.45
Fontana,Calif. K1 .....7.35
FranklinPark,Ill. T6 ...5.70
Ind.Harbor,Ind. I-2 ....5.70
Indianapolis C8 .....5.60
Lackawanna,N.Y. B2 ..5.45
LosAngeles C1 .....7.50
Mattapan,Mass. T6 ....6.10
Middletown,O. A10 ....5.45
NewBedford.Mass. R10..6.00
NewBritain(10) S15 ...5.45
NewCastle,Pa. B4, E5..5.45
NewHaven,Conn. A7 ...6.20
NewHaven,Conn. D2 ...5.90
Pawtucket,R.I. N8, R3..6.10
Pittsburgh J5 .....5.45
Riverdale,Ill. A1 .....5.70
Rome,N.Y.(32) R6 ....5.45
Sharon,Pa. S3 .....5.45
SparrowsPoint,Md. B2..5.45
Trenton,N.J. R5 .....7.00
Wall'ford,Conn. W2 ....5.90
Warren,O.(40) T5 ....5.45
Warren,O. B9, R2 ....5.45
Weirton,W.Va. W6 ....5.45
Worcester,Mass. A7 ....6.30
Youngstown C8, Y1 ....5.45

STRIP, Cold-Rolled Alloy Steel
Carnegie,Pa. S18 .....12.00
Cleveland A7 .....12.00
Dover,O. G6 .....12.00
Fontana,Calif. K1 ....13.65
Harrison,N.J. C18 ....12.00
Pawtucket,R.I.(11) N8.12.15
Pawtucket,R.I.(12) N8.12.45
Sharon,Pa. S3 .....12.00
Worcester,Mass. A7 ..12.30
Youngstown C8 .....12.00

STRIP, Cold-Rolled
High-Strength Low-Alloy
Cleveland J5 .....7.80
Cleveland A7 .....8.15
Dearborn,Mich. D3 ....7.90
Dover,O. G6 .....8.00
Ecorse,Mich. G5 .....8.30
Lackawanna,N.Y. B2 ..8.15
Pittsburgh J5 .....7.80
Sharon,Pa. S3 .....7.65
SparrowsPoint,Md. B2..8.15
Warren,O. R2 .....7.60
Weirton,W.Va. W6 ....8.15
Youngstown Y1 .....8.30

STRIP, Cold-Rolled Ingot Iron
Warren,O. R2 .....6.05

STRIP, Electrogalvanized
Dover,O. G6 .....5.45
Warren,O. B9, T5 .....5.45
Weirton,W.Va. W6 ....5.45
Youngstown C8 .....5.70

TIGHT COOPERAGE HOOP
Atlanta A11 .....4.65
Riverdale,Ill. A1 .....4.50
Sharon,Pa. S3 .....4.35
Youngstown U5 .....4.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke,Wickwire Spencer Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Div. H. K. Porter Co. Inc.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Products
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel&Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M16 Md. Fine & Special Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg.Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg.Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg.Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.60	7.95	8.90	10.85	13.15
Bridgeport,Conn.(10) S15	5.45	7.65	8.60	10.55	12.85
Bristol,Conn. W1	....	...	8.90	10.85	....
Carnegie,Pa. S18	...	7.65	8.60	10.55	12.85
Cleveland A7	5.45	7.65	8.60	10.55	12.85
Cleveland,O. C7	...	8.00	8.60	10.55	12.85
Dearborn,Mich. D3	5.60	7.85	8.80	....	....
Detroit D2	5.65	7.85	8.80	10.55	....
Dover,O. G6	5.45	7.65	8.60	10.55	12.85
FranklinPark,Ill. T6	5.70	7.80	8.75	10.70	13.00
Harrison,N. J. C18	....	...	8.90	10.85	13.15
Indianapolis C8	...	7.80	8.60	10.55	....
Mattapan,Mass. T6	6.10	7.95	8.90	10.85	13.15
NewBritn.,Conn.(10) S15	5.75	7.65	8.60	10.55	12.85
NewCastle,Pa. B4	5.45	7.65	8.60	....	....
NewCastle,Pa. E5	5.45	8.00	8.60	10.55	12.85
NewHaven,Conn. D2	5.90	7.95	8.90	10.85	....
NewYork W3	...	7.95	8.90	10.85	13.15
Pawtucket,R.I.(11) N8	...	7.65	8.60	10.55	12.85
Pawtucket,R.I.(12) N8	6.10	7.95	8.90	10.85	13.15
Sharon,Pa. S3	5.45	7.65	8.60	10.55	12.85
Trenton,N.J. R5	....	7.95	8.90	10.85	13.15
Wallingford,Conn. W2	5.90	7.95	8.90	10.85	13.15
Warren,O. T5	5.45	7.65	8.60	10.55	12.85
Weirton,W.Va. W6	5.45	7.65	8.60	10.55	12.85
Worcester,Mass. A7	6.30	7.95	8.90	10.85	13.15
Worcester,Mass. T6	6.10	7.95	8.90	10.85	13.15
Youngstown C8	...	7.65	8.60	10.55	12.85
Spring Steel (Tempered)					
Buffalo W12	...	...	12.50	....	....
Bristol,Conn. W1	...	...	12.50	15.00	....
FranklinPark,Ill. T6	...	...	13.25	15.75	18.75
Harrison,N.J. C18	...	...	12.50	15.00	18.00
NewYork W3	...	...	12.50	15.00	18.00
Trenton,N.J. R5	...	...	12.50	15.00	18.00
Worcester,Mass. T6	...	...	12.50	15.00	18.00
Worcester,Mass. W12	...	...	12.50	....	....
Youngstown C8	...	...	12.85	15.35	18.35

SILICON STEEL

H.R. SHEETS (22 gage) (Cut Lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	...	...	8.75	9.75 10.65
Brackenridge,Pa. A4	.....	...	...	8.75	9.75 10.65
IndianaHarbor,Ind. I-2	.....	7.85	8.15	8.75	9.75 ....
Mansfield,O. E6	.....	7.85	8.15	8.75	9.75 10.65
Newport,Ky. N9	.....	7.85	8.15	8.75	9.75 10.65
Niles,O. N12	.....	7.85	8.15	8.75	9.75 ....
Vandergrift,Pa. U5	.....	...	8.15	8.75	9.75 10.65
Warren,O. R2	.....	7.85	8.15	8.75	9.75 ....
Zanesville,O. A10	.....	...	8.15	8.75	9.75 10.65

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
GraniteCity,Ill. G4	8.25*	8.60*	9.20*	10.20*	....
IndianaHarbor,Ind. I-2	8.05	8.40*	9.00*	....	....
Vandergrift,Pa. U5	8.05*	8.90	9.50	10.50	11.40
Warren,O. R2	8.05†	8.90	9.50	10.50	11.40

H.R. SHEETS (22 Gage) (Cut Lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.60	12.15	12.65	13.65
Brackenridge,Pa. A4	11.60	....	....	....
Newport,Ky. N9	11.60	....	....	....
Vandergrift,Pa. U5	11.60	12.15	12.65	13.65
Zanesville,O. A10	11.60	12.15	12.65	13.65

C.R. COILS & CUT LENGTHS

(22 Ga.)	T-100	T-90	T-80	T-73	T-72
Butler,Pa. A10	....	....	16.25	16.75	....
Vandergrift,Pa. U5	13.65	14.65	16.25	16.75	12.35‡
Warren,O. R2	....	....	....	....	12.35‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Fairless,Pa. U5	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40	7.65	8.05
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Fairless,Pa. U5	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind.Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp.Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	8.95
Weirton,W.Va. W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.50
Fairfield,Ala. T2	6.60
Fairless,Pa. U5	6.60
Gary,Ind. U5	6.50
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING

Black Plate (29 gage)	
Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.10

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

MANUFACTURING TERNES, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

MANUFACTURING TERNES, LT. Coated, 6 lb

Yorkville,O. W10	$8.65

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	5.525
Aliquippa,Pa. J5	5.525
Alton,Ill. L1	5.70
Atlanta A11	5.725
Bartonville,Ill. K4	5.625
Buffalo W12	5.525
Chicago W13	5.525
Cleveland A7, C20, R2	5.525
Crawfordsville,Ind. M8	5.625
Donora,Pa. A7	5.525
Duluth,Minn. A7	5.525
Fairfield,Ala. T2	5.525
Fostoria,O. (24) S1	5.75
Houston S5	5.925
Jacksonville,Fla. M8	6.05
Johnstown,Pa. B2	5.525
Joliet,Ill. A7	5.525
KansasCity,Mo. S5	6.125
Kokomo,Ind. C16	5.625
LosAngeles B3	6.475
Minnequa,Colo. C10	5.775
Monessen,Pa. P7	5.525
No.Tonawanda B11	5.525
Palmer,Mass. W12	5.825
Pittsburg,Calif. C11	6.475
Portsmouth,O. P12	5.525
Rankin,Pa. A7	5.525
So.Chicago,Ill. R2	5.525
So.SanFrancisco C10	6.475
SparrowsPoint,Md. B2	5.625
Sterling,Ill.(1) N15	5.525
Struthers,O. Y1	5.525
Waukegan,Ill. A7	5.525
Worcester,Mass. A7	5.825

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.925
Alton,Ill. L1	7.10
Bartonville,Ill. K4	7.025
Buffalo W12	6.925
Cleveland A7	6.925
Donora,Pa. A7	6.925
Duluth,Minn. A7	6.925
Fostoria,O. S1	6.925
Johnstown,Pa. B2	6.925
LosAngeles B3	7.875
Millbury,Mass.(12) N6	7.225
Minnequa,Colo. C10	7.175
Monessen,Pa. P7, P16	6.925
Muncie,Ind. I-7	7.125
Palmer,Mass. W12	7.225
Pittsburg,Calif. C11	7.875
Portsmouth,O. P12	6.925
Roebling,N.J. R5	7.225
So.Chicago,Ill. R2	6.925
So.SanFran. C10	7.875
SparrowsPt.,Md. B2	7.025
Struthers,O. Y1	6.925
Trenton,N.J. A7	7.225
Waukegan,Ill. A7	6.925
Worcester A7, J4	7.225
Worcester T6, W12	7.225

WIRE, Upholstery Spring

Aliquippa,Pa. J5	6.625
Alton,Ill. L1	6.80
Buffalo W12	6.625
Cleveland A7	6.625
Donora,Pa. A7	6.625
Duluth,Minn. A7	6.625
Johnstown,Pa. B2	6.625
LosAngeles B3	7.575
Minnequa,Colo. C10	6.80
Monessen,Pa. P7, P16	6.625
NewHaven,Conn. A7	6.925
Palmer,Mass. W12	6.925
Pittsburg,Calif. C11	7.575
Portsmouth,O. P12	6.625
Roebling,N.J. R5	6.925
So.Chicago,Ill. R2	6.625
So.SanFrancisco C10	7.575
SparrowsPoint,Md. B2	6.725
Trenton,N.J. A7	6.925
Waukegan,Ill. A7	6.625
Worcester,Mass. A7	6.925

WIRE, Fine & Weaving(8"Coils)

Alton,Ill. L1	10.75
Bartonville,Ill. K4	10.65
Buffalo W12	10.55
Chicago W13	10.55
Cleveland A7	10.55
Crawfordsville,Ind. M8	10.65
Fostoria,O. S1	10.55
Jacksonville,Fla. M8	11.08
Johnstown,Pa. B2	10.55
Kokomo,Ind. C16	10.55
Minnequa,Colo. C10	10.30
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Roebling,N.J. R5	10.85
So.SanFrancisco C10	10.90
Waukegan,Ill. A7	10.55
Worcester,Mass. A7,T6	10.85

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	9.50
Buffalo W12	9.50
Johnstown,Pa. B2	9.50
Minnequa,Colo. C10	9.625
Monessen,Pa. P16	9.50
Muncie,Ind. I-7	9.70
Portsmouth,O. D2	9.50
Roebling,N.J. R5	9.80
SparrowsPt.,Md. B2	9.60

ROPE WIRE (A)	
Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo W12	9.35
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.35
Monessen,Pa. P7, P16	9.35
Muncie,Ind. I-7	9.55
Palmer,Mass. W12	9.65
Portsmouth,O. P12	9.35
Roebling,N.J. R5	9.65
SparrowsPt. B2	9.45
Struthers,O. Y1	9.35
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for improved plow.

WIRE, Tire Bead

Alton,Ill. L1	12.75
Bartonville,Ill. K4	12.65
Monessen,Pa. P16	12.55
Roebling,N.J. R5	12.85

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	7.45
Baltimore T6	7.75
Buffalo W12	7.45
Cleveland A7	7.45
Crawfordsville,Ind. M8	7.55
Dover,O. G6	7.45
Fostoria,O. S1	7.45
Kokomo,Ind. C16	7.55
FranklinPark,Ill. T6	7.60
Massillon,O. R8	7.45
Monessen,Pa. P7, P16	7.45
Pawtkt.,R.I.(12) N8	7.75
Trenton,N.J. R5	7.75
Worcester A7, T6, W12	7.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld. Galv.
Ala.City R2	6.675 7.075**
Aliquippa J5	6.675 7.20*
Atlanta A11	6.775 7.30
Bartonville(48)K4	6.775 7.30
Buffalo W12	6.675 7.075†
Cleveland A7	6.675 ....
Crawfordsville M8	6.775 7.30
Donora,Pa. A7	6.675 7.075†
Duluth,Minn. A7	6.675 7.075†
Fairfield T2	6.675 7.075†
Houston,Tex. S5	7.075 7.475
Jacksonville,Fla. M8	7.20 7.73
JohnstownB2(48)	6.675 7.225*
Joliet,Ill. A7	6.675 7.075†
KansasCity,Mo. S5	7.275 7.675
Kokomo C16	6.775 7.175†
LosAngeles B3	7.625 ....
Minnequa C10	6.925 7.325**
Monessen P7(48)	6.675 7.225
Palmer W12	6.975 7.375†
Pitts.,Calif. C11	7.625 8.025†
Portsmouth,O.P12	6.675 ....
Rankin A7	6.675 7.075†
So.Chi'go R2	6.675 7.075**
S.S.Frn.(48)C10	7.625 8.025**
Spar'wsPt.B2(48)	6.775 7.325*
Sterl'g(1)(48)N15	6.675 7.20
Struthers,O. Y1	6.675 7.175
Worcester A7	6.975 ....

* Based on 10c zinc; † 5c zinc; ** Subject to zinc equalization extras.

WOVEN FENCE, 9-15½ Ga. Col.

Ala.City,Ala. R2	140**
Ala.City, 17 ga. R2	235**
Ala.City, 18 ga. R2	245**
Aliq'ppa,Pa.9-14½ga.J5	143*
Atlanta A11	145
Bartonville,Ill. K4	145
Crawfordsville,Ind. M8	145
Donora,Pa. A7	140†
Duluth,Minn. A7	140†
Fairfield,Ala. T2	140†
Houston,Tex. S5	148
Johnstown,Pa. B2	143
Johnstown 17 ga.,6"B2	234
Johnstown 4" B2	237
Joliet,Ill. A7	140†
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142†
Minnequa,Colo. C10	148**
Monessen,Pa. 9 ga. P7	145
Pittsburg,Calif. C11	163†
Rankin,Pa. A7	140†
So.Chicago,Ill. R2	140**
Sterling,Ill. (1) N15	143

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	149
Atlanta A11	151
Bartonville,Ill. K4	151
Crawfordsville,Ind. M8	151
Donora,Pa. A7	149
Duluth,Minn. A7	149
Fairfield,Ala. T2	149
Joliet,Ill. A7	149
KansasCity,Mo. S5	161
Kokomo,Ind. C16	151
Minnequa,Colo. C10	154
Pittsburg,Calif. C11	173
So.Chicago,Ill. R2	149
So.SanFran.,Calif. C10	17
SparrowsPoint,Md. B2	15
Sterling,Ill.(1) N15	14

WIRE, Barbed Co

AlabamaCity R2	153
Aliquippa J5	150
Atlanta A11	15
Bartonville,Ill. K4	15
Crawfordsville,Ind. M8	15
Donora,Pa. A7	153
Duluth,Minn. A7	153
Fairfield,Ala. T2	153
Houston,Tex. S5	16
Johnstown,Pa. B2	156
Joliet,Ill. A7	153
KansasCity,Mo. S5	16
Kokomo,Ind. C16	15
Minnequa,Colo. C10	159
Monessen,Pa. P7	15
Pittsburg,Calif. C11	173
Rankin,Pa. A7	153
So.Chicago,Ill. R2	153
S.SanFrancisco C10	176
SparrowsPoint,Md. B2	15
Sterling,Ill. (1) N15	15

† Based on 5c zinc; * 1 zinc; ** Subject to zi equalization extras.

An'ld. Gal	
WIRE (16 gage) Stone	Sto
Ala.City R2	12.50 14.05
Aliquippa J5	12.50 14.30
Bartonville K4	12.60 14.4
Buffalo W12	12.50 ..
Cleveland A7	12.50 ..
CrawfordsvilleM8	12.50 14.
Fostoria,O. S1	12.60 14.
Johnstown B2	12.50 14.3
Kokomo C16	12.60 14.1
Minnequa C10	12.75 14.45
Palmer,Mas.W12	12.50 14.0
Pitts.,Calif. C11	12.85 14.4
SparrowsPt. B2	12.60 14.4
Sterling(1) N15	12.50 14.
Waukegan A7	12.50 14.0
Worcester A7	12.80 ..

* Based on 11c zinc; † zinc; ** Subject to zi equalization extras.

NAILS, Stock

To dealers & mfrs. (7)	C
AlabamaCity,Ala. R2	1
Aliquippa,Pa. J5	1
Atlanta A11	1
Bartonville,Ill. K4	1
Chicago,Ill. W13	1
Cleveland A9	1
Crawfordsville,Ind. M8	1
Donora,Pa. A7	1
Duluth,Minn. A7	1
Fairfield,Ala. T2	1
Galveston,Tex. D7	1
Houston,Tex. S5	1
Johnstown,Pa. B2	1
Joliet,Ill. A7	1
KansasCity,Mo. S5	1
Kokomo,Ind. C16	1
Minnequa,Colo. C10	1
Monessen,Pa. P7	1
Pittsburg,Calif. C11	1
Rankin,Pa. A7	1
So.Chicago,Ill. R2	1
SparrowsPt.,Md. B2	1
Sterling,Ill. (1) N15	1
Worcester,Mass. A7	1

NAILS, CUT (100 lb keg)

To dealers (33)	
Conshohocken,Pa.	A3.. $
Wheeling,W.Va.	W10 ..

STAPLES, Polished Stock

To dealers & mfrs. (7)	
AlabamaCity,Ala.	R2 ..
Aliquippa,Pa.	J5 ....
Atlanta	A11 ....
Bartonville,Ill.	K4 ....
Crawfordsville,Ind.	M8 ..
Donora,Pa.	A7 ....
Duluth,Minn.	A7 ....
Fairfield,Ala.	T2 ....
Johnstown,Pa.	B2 ....
Joliet,Ill.	A7 ....
Kokomo,Ind.	C16 ....
Minnequa,Colo.	C10 ....
Monessen,Pa.	P7 ....
Pittsburg,Calif.	C11 ....
Rankin,Pa.	A7 ....
So.Chicago,Ill.	R2 ....
SparrowsPt.,Md.	B2 ....
Sterling,Ill.	(1) N15 ....
Worcester,Mass.	A7 ....

FENCE POSTS

ChicagoHts.,Ill.	C2 1-2.
Duluth,Minn.	A7 (49) .
Franklin,Pa.	F5 ....
Johnstown,Pa.	B2 ....
Marion,O.	P11 ....
Minnequa,Colo.	C10 ....
Moline,Ill.	R2 ....
So.Chicago,Ill.	R2 ....
Tonawanda,N.Y.	B12 ....
Williamsport,Pa.	S19 ..

AMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

e—Inches	2		2½		3		3½		4		5		6	
t Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
unds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
quippa, Pa. J5 (‡)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25
bridge, Pa. N2 (†)	15.75	...	19.75	...	22.25	...	23.75	...	23.75	...	23	...	25.5	....
rain, O. N3 (*)	15.75	4.5	19.75	5.5	22.25	8	23.75	9.5	23.75	9.5	23	8.75	25.5	11.25
ungstown Y1 (††)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25

ECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

ungstown R2 (**)	15.75	1.5	19.75	3.5	22.25	6.0	23.75	7.5	23.75	7.5	23	7.5	25.5	6.75

JTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

e—Inches	⅛		¼		⅜		½		¾		1		1¼		1½	
st Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c		27.5c	
unds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28		2.73	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
iquippa, Pa. J5 (‡)	...	...	....	...	....	....	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
ton, Ill. L1 (§)	...	...	....	...	....	....	24.25	9	27.25	13	29.75	16.5	32.25	17.5	32.75	18.25
enwood, W. Va. W10(††)	25.5	+0.25	17.75	+5.5	10.25	+10	26.25	11	29.25	15	31.75	18.5	34.25	19.5	34.75	20.25
tler, Pa. F6	26.5	—1.75	19.5	+2.75	12.5	+6.25	....	..	....	..	....	....	....	....	....	....
na, Pa. N2 (†)	...	...	....	...	....	....	26.25	7	29.25	11	31.75	14.5	34.25	16.25	34.75	17.25
irless, Pa. N3	...	...	....	...	....	....	24.25	..	27.25	..	29.75	...	32.25	....	32.75	....
ontana, Calif. K1 (§)	...	...	....	...	....	....	13.25	+3	16.25	1	18.75	4.5	21.25	5.5	21.75	6.5
d. Harbor Y1 (††)	...	...	....	...	....	....	25.25	9	28.25	13	30.75	16.5	33.25	17.5	33.75	18.5
rain, O. N3 (*)	...	...	....	...	....	....	26.25	16	29.25	20	31.75	23.5	34.25	23	34.75	24
aron, Pa. S4 (‡)	26.5	—0.25	19.50	+4.25	12.5	+8.5	....	..	....	..	....	....	....	....	....	....
aron, Pa. M6	...	...	....	...	....	....	26.25	11	29.25	15	31.75	18.5	34.25	19.25	34.75	20.25
arrows Pt., Md. B2 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	24.25	8	27.25	12	29.75	15.5	32.25	16.5	32.75	17.5
ungstown R2 (**)	...	...	....	...	....	....	26.25	12	29.25	16	31.75	19.5	34.25	20.0	34.75	21.0
ungstown Y1 (††)	...	...	....	...	....	....	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
heatland, Pa. W9 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5

ze—Inches	2		2½		3		3½		4	
ist Per Ft	37c		58.5c		76.5c		92c		$1.09	
ounds Per Ft	3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
liquippa, Pa. J5 (‡)	35.25	20	36.75	20	36.75	20	....	....	....	....
ton, Ill. L1 (§)	33.25	18.75	34.75	18	34.75	18	....	....	....	....
enwood, W.Va. W10(††)	35.25	20.75	36.75	20.5	36.75	20.5	27.75	11	27.75	11
tna, Pa. N2 (†)	35.25	17.25	36.75	18.5	36.75	18.5	27.75	9	27.75	9
airless, Pa. N3	33.25	....	34.75	....	34.75	...	25.75	....	25.75	....
ontana, Calif. K1 (§)	22.25	7	23.75	7	23.75	7	....	....	....	....
d. Harbor, Ind. Y1 (††)	34.25	19	35.75	19	35.75	19	....	....	....	....
rain, O. N3 (*)	35.25	24.5	36.75	23	36.75	23	....	....	....	....
aron, Pa. M6	35.25	20.75	36.75	20.5	36.75	20.5	....	....	....	....
parrows Pt., Md. B2 (§)	32.25	18	34.75	18	34.75	18	25.75	8.5	25.75	8.5
oungstown R2 (**)	35.25	21.5	36.75	21.0	36.75	21.0	27.75	11.5	27.75	11.5
oungstown Y1 (††)	35.25	20	36.75	20	36.75	20	....	....	....	....
heatland, Pa. W9 (‡)	35.25	20	36.75	20	36.75	20	....	....	....	....

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 11c to under 12c; (*), 5c; (§), 10c to under 11c; (††), 10.50c-11.50c; (**), 9.50c; with discounts adjusted on price of zinc at time of shipment.

OILER TUBES

Net base c.l. prices, dollar per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
	13	....	19.02	18.44
¼	13	....	22.53	18.12
½	13	20.65	24.91	20.01
¾	13	24.40	29.43	23.66
	13	27.34	32.98	26.51
1¼	13	30.80	37.15	29.86
1½	12	33.43	40.32	32.41
1½	12	36.82	44.41	35.70
1¾	12	39.87	48.09	38.66
3	12	42.52	51.28	41.23

RAILWAY MATERIALS

RAILS	Std. No. 1	Std. No. 2	Std. Tee Rails All No. 2	60 lb Under
Bessemer,Pa. U5	4.325	4.225	4.275	5.20
Ensley,Ala. T2	4.325	4.225	....	5.20
Fairfield,Ala. T2	....	....	....	5.20
Gary, Ind. U5	4.325	4.225	4.275	...
Huntington,W.Va. W7	....	....	....	5.20
IndianaHarbor,Ind. I-2	4.325	4.225	4.275	...
Johnstown,Pa. B2	....	....	...(16)	5.20
Lackawanna,N.Y. B2	4.325	4.225	....	5.20
Minnequa,Colo. C10	4.325	4.225	....	5.70
Steelton,Pa. B2	4.325	4.225	....	...
Williamsport,Pa. S19	....	....	....	5.20

TIE PLATES

Fairfield,Ala. T2 ..... 5.125
Gary,Ind. U5 ..... 5.125
Ind.Harbor,Ind. I-2 ..... 5.125
Lackawanna,N.Y. B2 .. 5.125
Minnequa,Colo. C10 ... 5.125
Pittsburg,Calif. C11 ... 5.275
Seattle B3 ..... 5.275
Steelton,Pa. B2 ..... 5.125
Torrance,Calif. C11 ... 5.275

TRACK BOLTS (20) Treated

Cleveland R2 ..... 11.00
KansasCity,Mo. S5 ... 11.00
Lebanon,Pa. B2 ..... 11.00
Minnequa,Colo. C10 ... 11.00
Pittsburgh O3, P14 ... 11.00
Seattle,Wash. B3 ..... 11.50

JOINT BARS

Bessemer,Pa. U5 ..... 5.275
Fairfield,Ala. T2 ..... 5.275
Ind.Harbor,Ind. I-2 ... 5.275
Joliet,Ill. U5 ..... 5.275
Lackawanna,N.Y. B2 .. 5.275
Minnequa,Colo. C10 ... 5.275
Steelton,Pa. B2 ..... 5.275

AXLES

Ind.Harbor,Ind. S13 .... 6.50
Johnstown,Pa. B2 ..... 6.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2 ..... 7.05
Ind.Harbor,Ind. I-2, Y1 7.05
KansasCity,Mo. S5 .... 7.30
Lebanon,Pa. B2 ..... 7.05
Minnequa,Colo. C10 .... 7.05
Pittsburgh J5 ..... 7.05
Seattle B3 ..... 7.55
So.Chicago,Ill. R2 .... 7.05
Struthers,O. Y1 ..... 7.05
Youngstown R2 ..... 7.05

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 8.90c
⅞-in. under ..... 26.5 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS
(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:
½-in. & smaller diam. 4
⅝-in. & ⅝-in. 5
¾-in. and larger 3
Longer than 6 in.:
All diams. ..... +4
Lag bolts, all diams.:
6 in. and shorter.... 12
Over 6 in. long 8
Ribbed Necked Carriage 5
Blank 25
Plow 25
Step, Elevator, Tap and Sleigh Shoe 12
Tire Bolts ..... List
Boiler & Fitting-Up Bolts 23

NUTS

H.P. & C.P., regular & heavy:
Square, all sizes 58
H.P., Hex, regular & heavy:
¾" and smaller 58
⅞" to 1⅛", inclusive. 60
1¼" to 1½", inclusive 62
1⅝" and larger 58
C.P. Hex regular & heavy:
All sizes 58
Hot Galv. Nuts (all types):
¾" and smaller 40
⅞" to 1½", inclusive. 43
Finished Hex Nuts:
New standard, all sizes 58
Semifinished & Slotted Hex:
Regular and heavy, all sizes 58

SQUARE HEAD SET SCREWS
(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter 34
1 in. and smaller diam. x over 6 in. 20

HEADLESS SET SCREWS
(Packaged; per cent off list)

No. 10 and smaller 34
¼ in. diam & larger.... 14
N.F. thread, all diams.. 8

STEEL STOVE BOLTS
(F.o.b. plant, per cent off list in packages)

Plain finish .....47.5 x 10
Plated finishes .....30 x 10

HEXAGON CAP SCREWS
(1020 steel; packaged; per cent off list)

6 in. or shorter:
⅝-in. & smaller 38
¾-in. through 1 in. .. 22
Longer than 6 in.:
⅝-in. and smaller ... 20
¾-in. through 1 in. .. 7

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge Iron: Cents
98+% Fe, annealed. 18.00
Unannealed
Minus 100 mesh .. 14.50
Minus 35 mesh .. 10.50
Minus 20 mesh .. 10.00
Swedish, c.i.f. N. Y., c.l., in bags 11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags.... 11.25
Electrolytic iron:
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in. 23.00
Annealed, 99.5% Fe. 42.50
Unannealed (99+% Fe) 36.50
Unannealed (99+% Fe) (minus 325 mesh) 53.50
Powder Flakes (minus 16, plus 100 mesh).. 31.00
Carbonyl Iron:
97.9-99.8% size 5 to 10 microns..83.00-148.00
Aluminum:
Atomized, 500 lb drums, frgt. allowed:
Carlots 31.00
Ton lots 34.00
Antimony, 500 lb lots 32.00*
Brass, ¼-ton lots .....28.75-37.50†
Bronze, ¼-ton lots .....50.00-60.00‡
Copper:
Electrolytic 13.50*
Reduced 13.50*
Lead 7.50*
Magnesium 54.00-56.00
Manganese:
Minus 35 mesh 61.00
Minus 100 mesh 67.00
Minus 200 mesh 72.00
Nickel, unannealed ... 89.50
Nickel-Silver, ¼-ton lots .....44.00-49.00§
Nickel-Silver, ¼-ton lots 46.75**
Phosphor-Bronze, ¼-ton lots 58.50
Silicon 43.50
Solder 8.50*
Stainless Steel, 302 ... 91.00
Tin 14.50*
Zinc, ¼-ton lots.15.00-28.75‡
Tungsten Dollars
Melting grade, 99% 60 to 200 mesh:
1000 lb and over... 4.95
Less than 1000 lb .. 5.10
Chromium electrolytic 99.9% Cr min. 3.50

*Plus cost of metal, †Depending on composition, ‡Depending on mesh. §70% Cu, 20% Zn, 10% Sn. **64% Cu, 18% Zn, 18% Sn.

Footnotes

(1) Chicago base.
(2) Angles, flat, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛" to 1 7/16"; 1 7/16" to 1 15/16" 4.58c; 1 15/16" to 7 5/16" 4.95c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 16 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.40c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon and 0.35c for H.S.-L.A.
(31) Base; deld. within mill county.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 gage & lighter: 60" & narrower.
(38) 14 gage & lighter: 48" and narrower.
(39) 48" and narrower.
(40) Lighter than 0.035": 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(48) 6-7 gage.
(49) T-post; deduct 2 cols for U-post.

STAINLESS STEEL MILL PRICES

(Representative prices cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. Bars; H.R. Strip	Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	38.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	41.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	44.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	43.75	43.75
304L	....	....	36.75	....	....	42.75	45.25	49.00	49.00
306	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	48.00	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	62.00	62.00
309S	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	62.75	67.50	69.00	72.25	72.25
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	53.25	55.50	59.00	62.75	62.75
316L	....	....	52.50	....	58.25	61.00	64.25	67.75	67.75
317	33.00	43.50	58.25	66.75	67.50	68.25	70.75	77.00	77.00
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	80.25	80.25
321	22.75	29.50	35.25	40.75	41.00	42.00	46.00	50.50	50.50
330	....	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	59.25	59.25
403	....	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	34.25	34.25
416	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	35.25	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	....	33.75	38.25	50.25	39.50	40.75	59.75	59.75
501	....	....	....	14.00	14.50	21.25	16.00	18.25	29.00	29.00
502	....	....	....	15.25	16.00	22.25	17.00	20.00	30.00	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Shenango Agaloy Tube Co.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

CLAD STEEL

Cladding Stainless	Plates: Carbon Base 10%	Plates: Carbon Base 20%	Sheets: Carbon Base 20%	Sheets: Copper Base Both Sides
302	....	31.00	31.00	77.00
304	27.60	32.50-32.70	32.50	77.00
310	36.50	41.00	.....	144.00
316	32.60	37.70-42.75	42.75	....
318	37.00	42.20	.....	....
321	29.80	34.40-37.00	37.00	111.00
347	30.40	35.50-40.50	40.50	130.00
405	23.40	30.60	.....	....
410	22.90	30.10	.....	....
430	22.90	30.10	.....	....
Inconel	41.23	54.18	.....	165.00
Nickel	37.50	50.90	.....	....
Monel	38.90	51.80	.....	....
Copper*	....	.....	46.00	....

	Strip, Carbon Base: Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	27.85	35.85	24.00	32.25

* Deoxidized. Production points: Stainless sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22; Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.

TOOL STEEL

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.25	5% Cr Hot Work	0.39
Extra Carbon	0.30	W-Cr Hot Work	0.41
Special Carbon	0.355	V-Cr Hot Work	0.42-.43
Oil Hardening	0.37-.390	Hi-Carbon-Cr	0.665-.70

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	3.873
18.25	4.25	1	4.75	...	2.160-2.320
18	4	2	9	...	2.513
18	4	2	....	...	1.640
18	4	1	....	...	1.486
13.5	4	3	....	...	1.733
6.4	4.5	1.9	....	5	1.005-1.055
6	4	3	....	6	1.240
2	1.4	1.2	....	...	0.493
1.5	4	1	....	8.5	0.865-0.893

Tool Steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

PIG IRON Gross Ton

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	....	....
Woodward,Ala. W15	52.38	52.88	56.50†	....
Cincinnati, del.	....	60.43	....	....
Buffalo District				
Buffalo R2, H1	56.00	56.50	57.00	....
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No. Tonawanda,N.Y. T9	....	56.50	57.00	....
Boston, del.	66.65	67.15	67.65	....
Rochester,N.Y., del.	59.02	59.52	60.02	....
Syracuse,N.Y., del.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee, del.	58.17	58.67	58.67	59.17
Muskegon,Mich., del.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron,O., del. from Cleve.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem,Pa. B2	58.00	58.50	59.00	59.50
NewYork, del.	....	62.28	62.78	....
Newark, del.	61.02	61.52	62.02	62.52
Birdsboro, Pa. B10	58.00	58.50	....	....
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, del.	59.66	60.16	60.66	61.16
Troy,N.Y. R2	58.00	58.50	59.00	....
Pittsburgh District				
Nevillelsland,Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Ambridge, Aliquippa, del.	57.37	57.87	57.87	58.37
McKeesRocks, del.	57.04	57.54	57.54	58.04
Lawrenceville,Homestead, Wilmerding,Monaca, del.	57.66	58.16	58.16	58.66
Verona,Trafford, del.	58.19	58.69	58.69	59.19
Brackenridge, del.	58.45	58.95	58.95	59.45
Bessemer, Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....
Monessen,Pa. P7	56.00	....	....	....
Youngstown District				
Hubbard,O. Y1	....	....	56.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield,O., del.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	60.75	61.25	61.75	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T3	....	....	56.50	....
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, del.	61.76	62.26	....	....

* Low phos. southern grade. † Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereover base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; and $1.50 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$67.0
Buffalo H1	68.5

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.45 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$87.
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	92.
Keokuk, OH & Fdry, 12½ lb piglets, 16% Si, frgt, allowed K2	95.
Wenatchee,Wash. OH & Fdry, freight allowed K2	92.

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate A7	$61.
Rockwood,Tenn. T3	70.
Steelton,Pa. B2	64.
Philadelphia, del.	64.
Troy,N.Y. R2	64.

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WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except: New York, 3 cents; Philadelphia, 25 cents; Birmingham, Erie, St. Paul, 15 cents; Seattle and Spokane, Wash., no charge.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Baltimore	6.20	7.12	7.78	7.00	...	6.86	8.17[6]	12.04	6.98	6.85	7.98
Birmingham	6.10	7.00	8.00	6.30	...	6.15	8.90	....	6.35	6.35	8.25
Boston	6.89	7.83	9.18	7.13	...	6.87	8.35	12.13	7.06	7.13	8.26
Buffalo	6.18	7.15	8.70	6.79	...	6.35	7.70	12.02	6.59	6.68	7.88
Charlotte, N. C.	6.95	7.80	8.69	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.18	7.12	7.95	6.42	...	6.28	7.30	11.60	6.46	6.33	7.46
Cincinnati	6.30	7.11	8.20	6.66	...	6.52	7.60	11.85	6.64	6.62	7.71
Cleveland	6.18	7.12	8.25	6.58	...	6.34	7.40	11.74	6.79	6.50	7.63
Detroit	6.38	7.29	8.22	6.69	7.36	6.56	7.60	11.97	6.91	6.80	7.80
Erie, Pa.	6.15	...	8.15	6.45	...	6.23	7.50[6]	....	6.46	6.33	7.46
Houston	7.15	7.60	9.23	7.45	9.30	7.45	9.30	....	7.35	7.20	8.55
Los Angeles	7.25	9.00	8.85	7.55	11.20	7.15	9.10	13.10	7.35	7.20	9.25
Milwaukee	6.35	7.29	8.12	6.59	...	6.45	7.57	11.77	6.63	6.50	7.63
Moline, Ill.	6.53	7.47	8.30	6.77	...	6.63	7.65	....	6.81	6.68	...
New York	6.78	7.52	8.37	7.16	...	7.06	8.43[6]	11.99	6.90	6.99	8.30
Norfolk, Va.	6.90	...	...	7.00	...	7.00	8.50	....	7.00	7.00	7.85
Philadelphia	6.35	7.13	7.87	7.02	8.80	6.87	8.19[6]	11.74	6.67	6.63	7.66**
Pittsburgh	6.18	7.12	8.00	6.55	...	6.28	7.65	11.60	6.46	6.33	7.46
Portland, Oreg.	7.60	8.45	9.05	7.65	...	7.35	10.65	....	7.25	7.30	9.15
Richmond, Va.	6.50	...	8.67	7.10	...	7.05	8.20	....	7.10	6.85	8.20
St. Louis	6.48	7.42	8.25	6.72	...	6.58	7.70	11.90	6.86	6.73	7.86
St. Paul	6.84	7.78	8.61	7.08	...	6.94	8.06	....	7.12	6.99	8.12
San Francisco	7.35	8.70	8.95	7.60	...	7.15	9.75	12.90	7.25	7.20	9.25
Seattle	8.15	9.50	9.80	8.00	...	7.60	10.65	13.50	7.50	7.60	9.40
Spokane	8.15	9.40[7]	9.80	7.60	...	7.60	10.55[8]	14.10	7.25	7.35	9.40
Washington	6.71	7.65	8.35	7.51	...	7.37	8.43	....	7.49	7.36	8.49

*Prices do not include gage extras; †prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extras excluded); ‡includes 35-cent special bar quality extra; §as rolled; **⅛-in. and heavier, add 0.34c for 12 gage and lighter. ††as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over, except in Seattle where base is 2000 to 9999 lb; [2]—500 to 9999 lb; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 lb to 3999; [8]—under ½ in.

Warehouse Steel Demand Remains Light

Buying is confined chiefly for specific jobs and practically none is in anticipation of a possible steel strike. Distributors have about 85 per cent more steel than a year ago

Chicago—Business at steel warehouses continues to be slow. One important warehouseman predicts that warehouses this year will take only 11 per cent of the steel turned out by the mills, compared with a normal of 19 to 20 per cent. Warehouses have 85 per cent more steel than they did a year ago, and are trying to reduce their inventories.

Pittsburgh—Fluctuations in sales continue, with brief spurts as fabricators replenish inventories. Most distributors believe sales will drop no farther from the present low point. While fabricators are watching closely for the possibility of a steel strike, they aren't building inventories. Best selling product remains wide flange beams. Shipments of hot and cold-rolled sheets are dull.

Philadelphia — Warehouse demand continues at about the April level. None of the major products appears to be moving more actively than others. Buying is for specific jobs.

No price changes are reported in stainless following recent adjustments by the leading producer. However, distributors stand ready to meet competition, and it appears likely revisions in their stainless schedules will be made shortly, some prices going up and some down.

Cleveland—Steady volume of orders is coming to warehouses here but total tonnage is substantially under that of a year ago. Seasonal requirements have increased for building steel items. Manufacturing needs are little changed from April. Some buyers request immediate shipments indicating fill-in needs are rising with over-all inventories on the decline.

Boston — Improvement in warehouse volume is confined mostly to seasonal factors, construction and associated products. In this category, light structurals and bar shapes are hardly keeping pace. Industrial orders are fairly numerous.

STEEL IMPORT PRICES

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast*
Deformed Bars, Intermediate, ASTM-A-305	$4.55	$4.55	$4.50	$4.83
Bar Size Angles	4.40	4.40	4.35	4.68
Structural Angles	4.40	4.40	4.35	4.68
I-Beams	4.40	4.40	4.35	4.68
Wide Flange Beams	4.80	4.80	4.80	5.08
Sheet and Plate, 10 gage, 11 gage, 5' x 10'	5.50	5.50	5.45	5.78
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.50	25.70	25.50	26.34
Barbed Wire	6.60	6.60	6.60	6.68
Merchant Bars	4.55	4.55	4.50	4.83
Hot-Rolled Bands	4.70	4.70	4.65	4.98
Wire Rods, Thomas Commercial No. 5	4.77	4.84	4.82	5.09
Wire Rods, O-H, Cold Heading Quality No. 5	5.23	5.30	5.28	5.55
Bright Common Wire Nails, 8d	6.55	6.65	6.60	6.85

*Not including $2.20 per net ton customarily charged in most West Coast ports for wharfage and handling.

Size O.D.	Wgt/Foot/Lb	Gulf Port	West Coast	Vancouver
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.63/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

out small individually, fill-ins reflecting close buying by users of carloon and specialty products.

Cincinnati — One distributor here expresses satisfaction with sales. His April business was up 10 per cent over March and he anticipates May volume will be at the April level.

Los Angeles—Distributors report they are over-stocked in all grades of sheets.

San Francisco—May is building up to a better month than any in the last six for steel warehouses here.

Seattle — Continued improvement in volume and general conditions is reported by warehouse interests.

Steel Output Off in April

New York—Steel ingot production in April totaled 6,973,000 net tons, reports the American Iron & Steel Institute. This compares with output of 7,289,600 tons in March and with 9,545,538 tons in April a year ago.

Output during April was 1.3 per cent higher than the average during 1947-49 inclusive. This is indicated by the index of production which stood at 101.3 in April, and which is based on the average output of the 1947-49 period.

In the first four months this year production amounted to 29,297,323 net tons. The index for this period was 106.4. A year's output at the rate of the first four months would result in production of more than 89 million net tons of ingots and steel for castings.

Comparative data follow:

Sheet Demand Still Disappointing

Some improvement in buying noted but market lacks zip with users largerly covering nearby needs. Seasonal pickup in galvanized items is continuing

Sheet and Strip Prices, Page 142 & 143

Cleveland — Demand for the light flat-rolled products is showing some signs of improvement, but tonnage still is disappointing. Consumers appear to be still working off inventories but prompt shipment orders are more numerous, indicating stocks have been pretty well reduced in some areas of the market.

As a general thing, sellers anticipate little change in demand volume over coming weeks with prompt shipments available. Protective buying against a possible steel strike this summer has not developed in any noticeable volume as yet, but the view is held that a spurt in demand may develop as the labor negotiations proceed.

New York—Sheet buying isn't losing ground, but sellers say improvement is scarcely discernible. Stove requirements are a shade better. Air conditioning demands are still fairly brisk and there is a seasonal rise in specifications from fabricators of light underground fuel oil storage tanks. However, there is a definite lag in orders from manufacturers of household durables generally and not quite the volume there was from fabricators of metal furniture, cabinets and shelving, despite fairly good operations in these lines.

It appears, there is still too much in the way of inventories. Also, warehouses are specifying slowly.

Most producers can promise three weeks delivery on hot sheets and four to five weeks on cold sheets. Promises on galvanized sheets are a shade more extended and, relatively, are moving more actively than either hot or cold sheets.

Boston—If only slightly heavier, sheet and strip volume is on a broader base for May. More consumers are again buying. Orders usually are but a fraction of the tonnage involved in second quarter placements last year. Most users are covering against nearby requirements, building no inventory except in a few cases against the possibility of suspension in production this summer.

Sheet demand is relatively more active than that for strip in the cold-rolled carbon grades. Producers of the latter are operating well below capacity, largely from inventory. They are placing light orders for hot-rolled. Galvanized sheet orders are up slightly. Less carbon grade waster tonnage is available.

Chicago — Among the light flat-rolled steel products, tin plate and galvanized sheets are in strongest demand. One producer is booked full on

Period	OPEN HEARTH Net tons	OPEN HEARTH Per cent of capacity	OPEN HEARTH ‡Index	BESSEMER Net tons	BESSEMER Per cent of capacity	BESSEMER ‡Index	ELECTRIC Net tons	ELECTRIC Per cent of capacity	ELECTRIC ‡Index	TOTAL Net tons	TOTAL Per cent of capacity	TOTAL ‡Index	Calculated weekly production (Net tons)	Number of weeks in month
1954														
January	7,256,526	78.3	113.3	260,453	64.0	74.1	434,507	48.9	121.7	7,951,486	75.3	111.8	1,794,918	4.43
February	6,523,213	77.9	112.8	174,253	47.4	54.9	385,771	48.1	119.6	7,083,237	74.3	110.2	1,770,809	4.00
*March	6,649,667	71.7	103.8	207,726	51.1	59.1	432,207	48.7	121.0	7,289,600	69.0	102.5	1,645,508	4.43
*1st Qtr.	20,429,406	75.9	109.9	642,432	54.4	63.0	1,252,485	48.6	120.8	22,324,323	72.8	108.1	1,735,950	12.86
†April	6,368,000	70.9	102.7	163,000	41.4	47.9	442,000	51.4	127.9	6,973,000	68.2	101.3	1,625,000	4.29
1953														
January	8,841,679	101.4	138.0	350,200	88.9	99.7	706,083	81.2	197.7	9,897,962	99.1	139.1	2,234,303	4.43
February	7,939,299	100.8	137.2	329,389	92.6	103.8	664,091	84.6	205.9	8,932,779	99.1	139.0	2,233,195	4.00
March	9,050,773	103.7	141.3	354,710	90.0	101.0	762,615	87.7	213.5	10,168,098	101.8	142.9	2,295,282	4.43
1st Qtr.	25,831,751	102.0	138.9	1,034,299	90.4	101.4	2,132,789	84.5	205.7	28,998,839	100.0	140.4	2,254,964	12.86
April	8,493,909	100.5	137.0	334,605	87.7	98.4	717,024	85.2	207.4	9,545,538	98.7	138.7	2,225,067	4.29
May	8,925,163	102.3	139.3	354,577	90.0	100.9	717,340	82.5	200.8	9,997,080	100.1	140.5	2,256,677	4.43
June	8,394,502	99.4	135.4	332,060	87.0	97.7	677,917	80.5	196.1	9,404,479	97.2	136.6	2,192,186	4.29
2nd Qtr.	25,813,574	100.8	137.3	1,021,242	88.3	99.0	2,112,281	82.7	201.5	28,947,097	98.7	138.6	2,224,988	13.01
1st 6 mos.	51,645,325	101.4	138.1	2,055,541	89.3	100.2	4,245,070	83.6	203.6	57,945,936	99.4	139.5	2,239,889	25.87
July	8,316,342	95.5	129.8	324,068	82.4	92.2	635,263	73.2	177.9	9,275,673	93.1	130.4	2,098,569	4.42
August	8,463,155	97.0	132.1	310,074	78.7	88.2	632,351	72.7	177.0	9,405,580	94.2	132.2	2,123,156	4.43
September	8,076,277	95.8	130.3	287,638	75.6	84.6	519,513	61.9	150.3	8,883,428	92.1	129.0	2,075,567	4.28
3rd Qtr.	24,855,774	96.1	130.8	921,780	78.9	88.4	1,787,127	69.4	168.6	27,564,681	93.1	130.6	2,099,366	13.13
9 mos.	76,501,099	99.6	135.6	2,977,321	85.8	96.2	6,032,197	78.8	191.8	85,510,617	97.3	136.5	2,192,580	39.00
October	8,648,428	99.1	135.0	325,250	82.6	92.6	489,044	56.3	136.9	9,462,722	94.7	133.0	2,136,055	4.43
November	8,002,349	94.7	129.1	283,321	74.3	83.3	404,382	48.0	117.0	8,690,052	89.9	126.2	2,025,653	4.29
December	7,321,947	84.1	114.3	269,813	68.6	76.8	354,568	40.9	99.3	7,946,328	79.7	111.7	1,797,812	4.42
4th Qtr.	23,972,724	92.6	126.1	878,384	75.2	84.2	1,247,994	48.4	117.7	26,099,102	88.1	123.6	1,986,233	13.14
2nd 6 mos.	48,828,498	94.4	128.4	1,800,164	77.1	86.3	3,035,121	58.9	143.2	53,663,783	90.6	127.1	2,042,778	26.27
Total	100,473,823	97.9	132.2	3,855,705	83.2	93.2	7,280,191	71.1	173.1	111,609,719	94.9	132.2	2,140,578	52.14

Note—The percentages of capacity operated are calculated on weekly capacities in 1954 of 2,092,342 net tons open hearth, 91,810 net tons bessemer and 200,397 net tons electric ingots and steel for castings, total 2,384,549 net tons; based on annual capacities as of Jan. 1, 1954 as follows: Open hearth 109,094,730 net tons, bessemer 4,787,000 net tons, electric 10,448,680 net tons, total 124,330,410 net tons.

Note—The percentages of capacity operated are calculated on weekly capacities in 1953 of 1,969,275 net tons open hearth, 88,934 net tons bessemer and 196,250 net tons electric ingots and steel for castings, total 2,254,459 net tons; based on annual capacities as of Jan. 1, 1953 as follows: Open hearth 102,677,980 net tons, bessemer 4,637,000 net tons, electric 10,232,490 net tons, total 117,547,470 net tons.

*Revised. †Preliminary figures, subject to revision. ‡Index of production based on average weekly production of the three years 1947-1948-1949.

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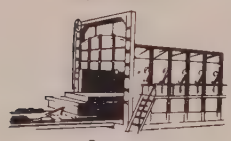
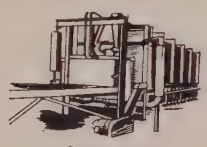
Box Furnaces



Gasmaco
Roller Hearth Furnaces



Gasmaco
Car Type Furnaces

For over fifty years The Gas Machinery Company has devoted its engineering and design skill to the building of industrial furnaces and gas generation equipment. Gasmaco fuel fired furnaces will help you solve your problems. They are built for many forging and heat treating processes: direct, radiant tube, and convection heating . . . rotary or straight through designs . . . high temperature roller hearth . . . cooling tables and conveyors, charging equipment and manipulators.

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Designers • Fabricators • Erectors
Gas Plant Equipment and Industrial Furnaces

THE GAS MACHINERY CO. (Canada), Ltd.
HAMILTON, ONTARIO

those products for the rest of this quarter. This producer is now quoting delivery not earlier than 10 to 12 weeks on galvanized. The same applies to culvert sheets.

This producer's delivery schedules on other products are: Hot-rolled sheets and strip, 3 to 4 weeks; cold-rolled sheets and strip, 4 to 5 weeks; electrical sheets, 4 to 5 weeks; enameling iron sheets, 4 to 5 weeks; sheared plates and universal mill plates, 4 to 5 weeks; rail steel bars, shapes and bands, 2 to 3 weeks; bars and bar shapes from new billet steel, about 2 weeks.

One user of light, flat-rolled steel, an appliancemaker, is producing refrigerators at only half the rate it was at this time last year. However, its freezer output is down only one-sixth and its air-conditioner production is strong.

Pittsburgh—Gradual gain in orders from appliance producers is bringing life to a generally dull market. Some appliance makers suggest they have trimmed inventories to a workable level now. May order volume remains close to April over-all, as little ordering is expected from automakers until they begin working on next year's models.

Philadelphia—Sheet producers note a further slight pick-up in demand for hot and cold-rolled sheets, and a rather substantial improvement in galvanized. With respect to the latter some tightening in deliveries followed the recent distribution of orders for the government grain storage bins.

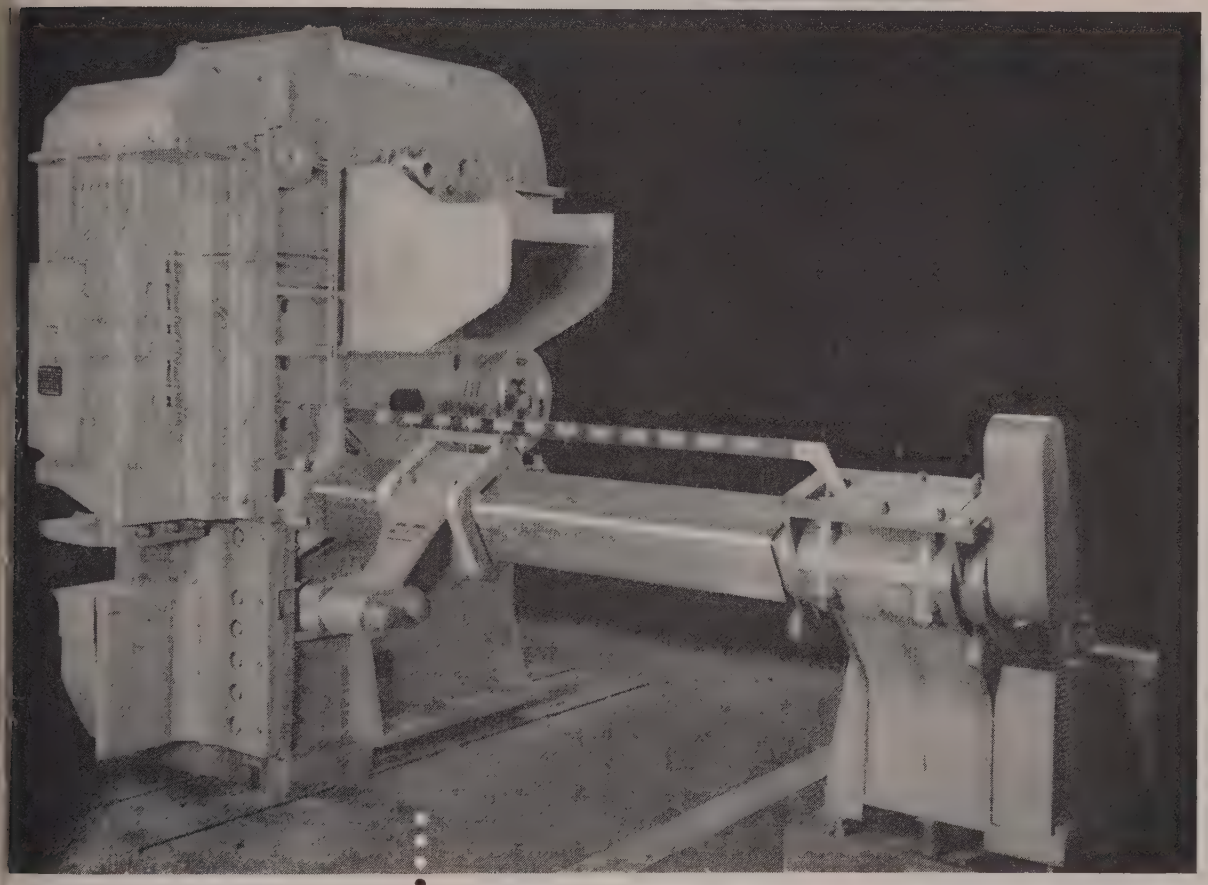
Stainless sheet demand is a shade better, and some producers report a little gain in enameling stock. Other specialties, however, including electrical sheets, are barely holding their own.

St. Louis—Sheet demand is fairly strong but with buying on hand-to-mouth basis. Mills feel consumer steel stocks have been worked down but finished stocks are backing up particularly in the appliance fields. Even the much-touted air-conditioner sales are reported disappointingly poor. One appliance maker is said to have five months of finished machines in warehouses. Farm equipment and galvanized roofing demand are currently good but below last year.

Cincinnati — Sheets are moving sluggishly. Supplies are abundant. Warehouse stocks are out of balance. Prospects are demand will remain slow though a steel strike would change this situation overnight.

FASTER CUTTING ACTION

with BIRDSBORO UP and DOWN CUT SHEARS



This 350-ton Birdsboro Up and Down Cut Shear and Gauge is used for hot shearing of 8″x 8″ carbon steel blooms. It eliminates the need for a shear depressing table as well as troublesome bent ends obtained with conventional hot shears. The gauge has a safety linkage to prevent breakage if the head is accidentally dropped on the bloom. This unit is typical of the types of stationary and flying shears Birdsboro can design and build to meet your shearing requirements.

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SPECIAL MACHINERY
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Weldments "CAST-WELD" Design
ROLLS: Steel, Alloy Iron, Alloy Steel

MM 32-54

BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., BIRDSBORO, PENNA. Offices in Birdsboro, Pa. and Pittsburgh, Pa.

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Fewer hands move more materials faster when a Conco Crane provides the "muscle." That means lower costs. Write today for Bulletin 3000A covering the full line of Conco Cranes, Hoists, Trolleys — each backed by 36 years experience.
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Semifinished Steel . . .

Semifinished Prices, Page 142

Chicago — Steel ingot production continues to climb in this district. In the week ended May 16 it was scheduled for 80 per cent of capacity. Although the preceding week had been scheduled for 76.5 per cent, production exceeded expectations and reached 79.5 per cent.

Inland Steel Co. is operating above rated ingot capacity. In the week ended May 16 it was scheduled for 103.7 per cent, compared with a performance of 103.6 in the preceding week.

One other producer in the district was scheduled for 93 per cent of capacity. One was in the 80s, two were in the 70s. Lowest rate in the district was 64 per cent.

Inland Steel expects its ingot production to be at, or slightly above, capacity for the rest of this quarter on the basis of orders booked.

Tin Plate . . .

Tin Plate Prices, Page 144

San Francisco — Demand for tin plate is among the brighter spots in the steel market. Inquiries are gaining as the can companies get ready for a good packing year.

Steel Bars . . .

Bar Prices, Page 142

Boston—Primary producers are accepting smaller individual carbon and alloy orders formerly going to warehouses.

Alloy demand is slow outside of the small group of consumers with defense contracts, still taking fixed tonnages each month. Demand for screw machine products is spotty.

New York—While concrete steel bars are moving well, merchant bar business remains spotty. Producers of hot carbon merchant bars can promise deliveries within two to four weeks, covering every popular size. Mostly, they can do better than four weeks on anything in the hot carbon line.

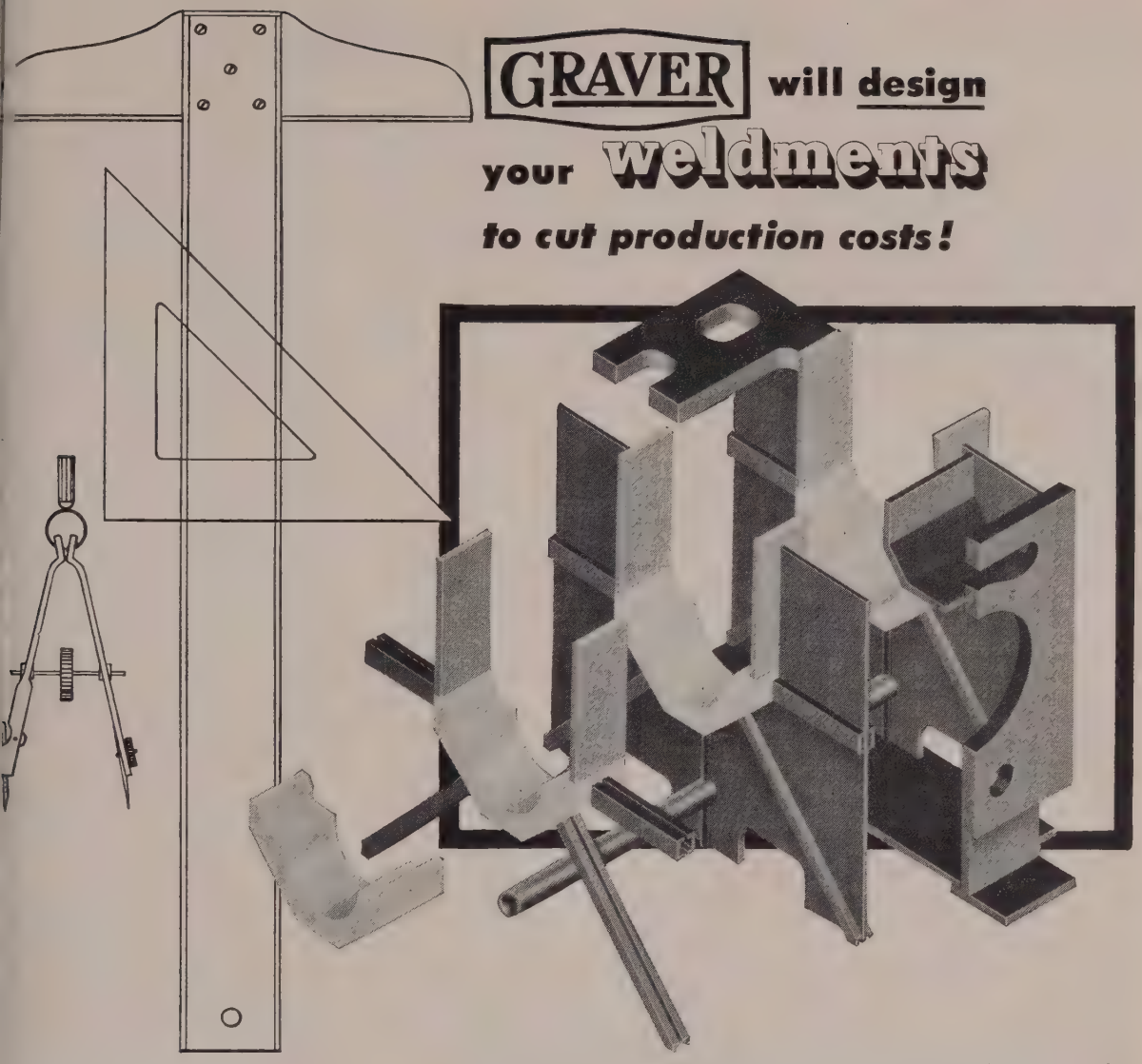
Complicating the situation for domestic sellers are the continued arrivals of foreign steel which are being sold under domestic levels. This is also true with respect to hot and cold sheets and light shapes.

Business in hot alloy bars also is quiet.

Philadelphia — Hot-rolled carbon bar business is diversified, but there is little outstanding activity in any one line and little change in general

(*Please turn to page* 159)

GRAVER will design your weldments to cut production costs!



Graver's Weldment Division is equipped to design your sub-assemblies and component parts, so that you may expect significant savings by simplifying manufacturing methods.

Graver uses all welding techniques for all types of alloys and carbon steel in thicknesses ranging from ¼ inch to 12 inches. The ability to maintain close tolerances . . . facilities that include one of the largest heat-treating furnaces in the country . . . and the employment of the latest, improved welding methods in successfully fabricating thousands of intricate weldments—all indicate Graver should be *your* weldment source.

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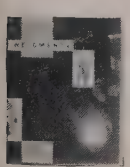
Graver has just completed a new authoritative booklet illustrating the many applications of Weldments in Industry. Send for your complimentary copy. Address: The Weldment Division



GRAVER WELDMENTS

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Sand Springs, Okla. • Odessa, Texas • Casper, Wyo.

CURRENT FERROALLOY QUOTATIONS

Prices as reported to STEEL

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $200, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; and Portland, Oreg.; add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $208 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 27.95c per lb of contained Mn, carload packed 28.7c, ton lots 29.8c, less ton 31.0c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max, 0.30% C, 1.5c for max 0.50% C, and 4.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85% C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 36.2c per lb of metal; packed, 36.95c; ton lot 38.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Min. carloads, 30c; 2000 lb to min. carloads, 32c; 250 lb to 1999 lb, 34c; less than 250 lb, 37c. Premium for hydrogen-removed metal, 1.5c per lb, f.o.b. cars, Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed, 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, C.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 36.50c. 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. 8 M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 10.8c per pound of contained silicon; 1" x down, bulk 25.25c per pound of contained chromium plus 11c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe) contract, 1" x D; packed, max 0.50%, carload $1.12, ton lots $1.14; less ton $1.16. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 4c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vandium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 10.80c per lb of contained Si, carload packed 12.40c, ton lot 13.85c, less ton 15.5c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 12.2c per pound contained silicon; carload packed 13.55c; ton lots, 14.75c; less ton, 16.1c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.8c per lb of contained Si, carload packed 15.1c, ton lot 16.25c, less ton 17.5c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe) C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max, 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.
Carbortam: (B 1 to 2%) Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c Delivered, Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c, per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.3c per lb of briquet. Packed c.l. 7.10c, ton lot 7.9c, less ton 8.8c. Delivered. Spot, add 0.25c.

(Small size—Weighing aprox. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.45c. Packed c.l. 7.25c, ton lot 8.05c, less ton 8.95c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $9.50 per lb of contained Cb, less ton $9.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $4.75 per lb of contained Cb plus Ta, deld.; less ton lots $4.80.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l packed 16.6c per lb of alloy, ton lots 18.10c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 14.50c. Packed c.l. 15.50c, ton lots, 15.75c, less ton lots, 16.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

FIRST

to inaugurate Employee Welfare in the Iron Ore Mining Industry

A special Welfare Department created in 1905 provides financial help in sickness, and death, and for medical treatment, for good housing at low rents and with excellent sanitary arrangements, for improving health conditions in the mines, and for increasing and extending educational opportunities for the employes and their families. A Pension System was instituted in 1909. The present-day towns on the iron ore ranges, with their alert and healthy citizens, churches, schools, community centers, clubs, summer and rest cottages, parks, etc., are eloquent testimonial of the success of the Cliffs Welfare Program.

LAKE SUPERIOR IRON ORE
VESSEL TRANSPORTATION
COAL • FERRO ALLOYS

THE Cleveland-Cliffs IRON COMPANY
UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

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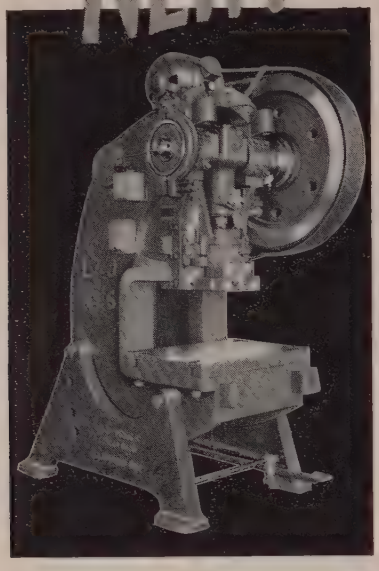

65-ton L&J Press

Here's the new No. 6 press that gives you more value through features that insure efficiency and low production costs.

The heavy, rigid frame holds deflection to a minimum for greater accuracy and longer die life. Extra depth of throat adds versatility. Replaceable bronze bushings for main and upper ram bushings. Buttress threads on ram screw and replaceable hard bronze ball seat. Roller bearings in flywheel or main gear and backshaft mountings. Long, precision-scraped gibs maintain alignment and accuracy. Air clutch available. Also made in back-geared model.

SPECIFICATIONS

Strokes per minute	85
Ram stroke, standard	4″
Max. stroke (to order)	7″
Throat depth	13½″
Die space, standard*	13″
Special,* up to	19″

*bed to ram, stroke down, adjust. up

Contact our local distributor for complete information. Also, 16 other O.B.I. models—6 to 80 ton capacities. Or, write for literature.

L&J PRESS CORPORATION
1628 STERLING AVENUE
ELKHART, INDIANA

ORES–COKE–REFRACTORIES

Prices as reported to STEEL; changes shown in italics.

ORES

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	20.00
North African hematite (spot)	20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, good commercial quality	$28.00
Domestic scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, $1.02-$1.05 per long ton unit c.i.f. U. S. ports, duty for buyer's account; 46-47%, $0.95-$0.97.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$40.00-$42.00
48% 3:1	44.00-46.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$24.00-$26.00
48% no ratio	34.00

Domestic

(Rail nearest seller)

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mo content mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$2.40-$2.80
65% min.	$3.40-$3.50

Vanadium Ore

Cents per lb. V_2O_5 content, deld. mills Domestic	31.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $109; Salina, Pa., $114; Niles, O., $120; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $115; Warren, O., Hays, Pa., $120; Niles, O., $120; E. Chicago, Ind., Joliet, Rockdale, Ill., $125; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O. $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $109; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa., $174; Johnstown, Pa., $177.80; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.80.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $179; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $223.00; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $225; Danville, Ill., $258; Clearfield, Pa., $252.

Dolomite

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Nario, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $14.60; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite

Domestic, deadburned bulk; Luning, Nev., $38.

METALLURGICAL COKE

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-$15.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearney, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, deld.	28.12
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Lone Star Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa., ovens	23.00
St. Louis, ovens	
St. Louis deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O. ovens	24.00
Cincinnati, deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Buffalo, deld.	28.08
Flint, deld.	28.23
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$44-$47
Birmingham area	45.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

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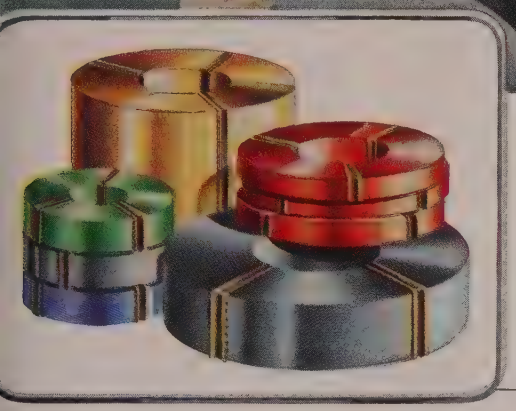
Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $44; 70%, $42.50; 60%, $38. Imported, net ton, duty paid, metallurgical grade, $35-$36.

ELECTRODES

(Threaded with nipple, unboxed f.o.b. plant)

Inches Diam.	Length	Per 100 lb
GRAPHITE		
2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5½	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18	72	20.50
20	72	20.00
CARBON		
40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55



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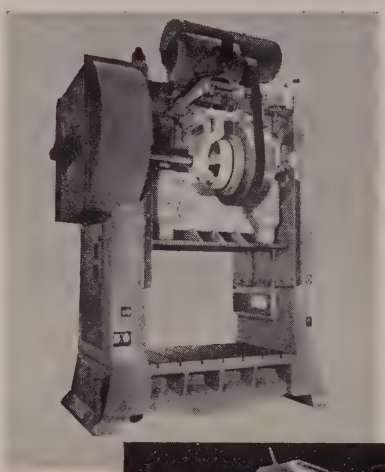
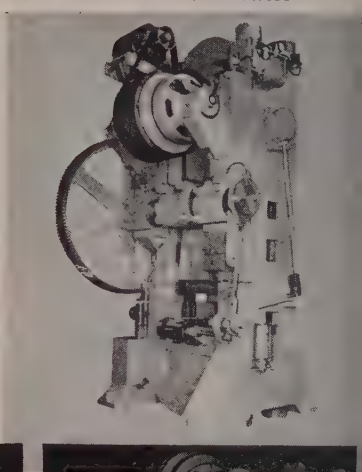


KNUCKLE JOINT PRESS



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CITY FOUNDRY DIVISION • SMALL TOOL DEPARTMENT

(*Concluded from page* 152)

olume. Nearby deliveries can be ad, regardless of size and shape.

Pittsburgh—Renegotiation of sev- ral government contracts for bar urchases may bring an improved efense demand for that product. urrently small tonnages are re- uired by defense industries.

Very little replenishing of inven- ories is taking place as a safeguard gainst a possible steel strike. While potty improvement in sales may oc- ur next month, no general upswing s expected before mid summer.

Cleveland—Demand for merchant ars is little changed in volume from ecent weeks. With prompt ship- nents available consumers are in- lined to order largely against needs. Relatively little in the way of strike rotective buying is noted, possibly eflecting the comfortable inventory osition of many consumers. This nay change, however, should labor egotiations indicate more clearly hat a strike is in the offing.

Cincinnati—Carbon bars continue o move slowly. Most sellers are verstocked.

Plates . . .

Plate Prices, Page 142

New York—Plate business continues to reflect the lag particularly in railroad equipment and shipyard needs. The decline in railroad buying since first of the year has far exceeded expectations of producers.

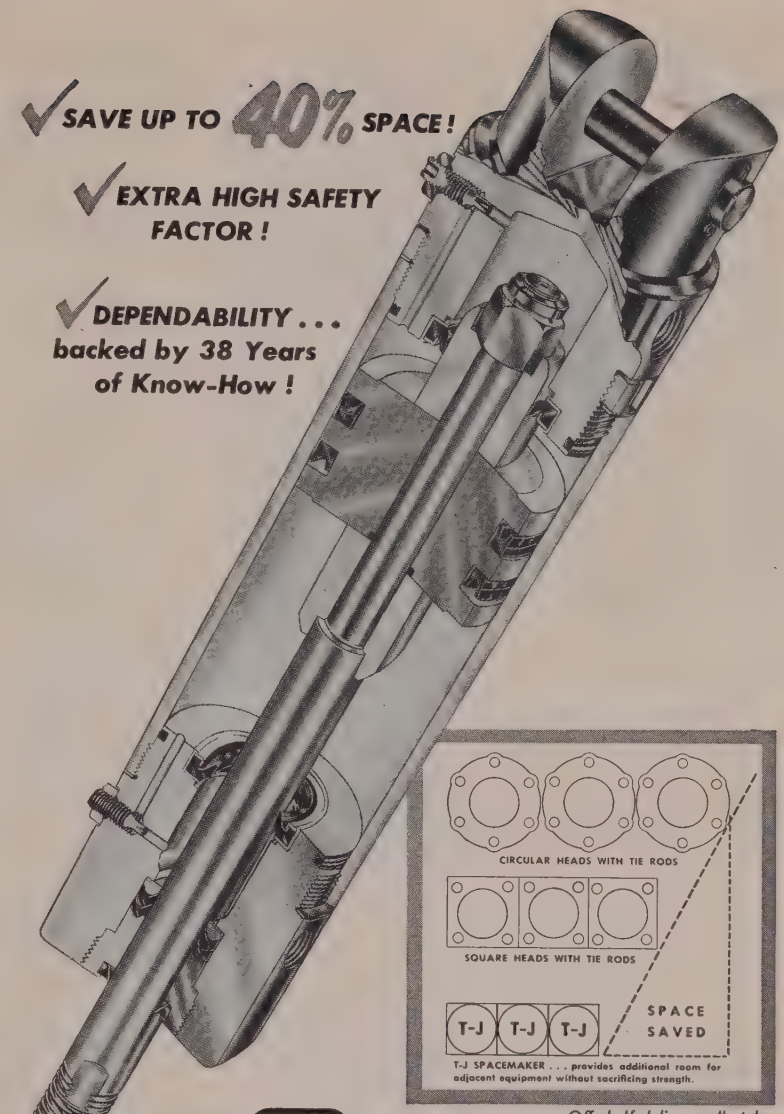
While carloadings are now beginning to inch upward a bit, and in a few cases some workmen are being called back to the railroad shops, there is still little railroad business in early prospect. However, light tank work is picking up a little and in general oil and chemical requirements are being sustained in reasonably good amount.

Eastern plate producers are averaging below normal operations and can promise early shipments—two weeks and less in some cases.

Boston — To the extent tank requirements are heavier, demand for light plates has improved. Most shops are not buying beyond specific needs and this procurement policy is abetted by prompt shipment of carbon plates, often by truck.

Philadelphia — District plate producers note a little better activity in light household boiler and storage tanks. Over-all demand, however, reflects little change in volume.

Pittsburgh—Plate business is declining. No evidence is seen of increased defense demand or purchases from warehouses and railroads.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✓DEPENDABILITY . . . backed by 38 Years of Know-How!
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Available with the new T-J Super Cushion Flexible Seals which insure positive cushion with automatic valve action for fast return stroke. Many standard sizes and styles . . . for pushing, pulling, lifting, clamping or control jobs. T-J dependability. Write for bulletin 454. The Tomkins-Johnson Co., Jackson, Mich.

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NOTHING EQUALS THE V-B JUNIOR

America's newest, simplest low-cost *blast cleaner*— for only $635

COMPARE these outstanding advantages with your present cleaning methods, then judge for yourself:

- **COMPLETELY DUST-FREE**—Patented Vacu-Blast pickup enables the V-B JUNIOR to operate **anywhere** . . . without interrupting other work.
- **REALLY CLEANS**—V-B JUNIOR gives metal the clean, scale-free surface needed for perfect welds . . . does it faster and better than grinding or wire brushing.
- **LIGHT WEIGHT, PORTABLE**—caster-mounted for easy mobility—weighs only 80 pounds—occupies less than 5 sq. ft. of floor space—uses many types of abrasive.
- **ECONOMICAL**—Low first cost, low operating cost and negligible maintenance cost spell economy—any way you look at it.

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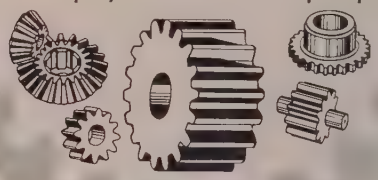

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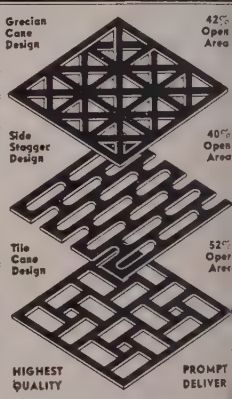

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69 Illustrations **Price $5.00 Postpaid**

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Book Department, 1213 W. 3rd St., Cleveland 13, O.

Wire . . .

Wire Prices, Page 144

Chicago—Merchant wire products ontinue in their steady, seasonal demand. Warehouses are pushing for May deliveries, indicating their stocks ave been cut to a bare minimum.

Demand for manufacturers wire remains at the slow pace of the last wo months. Some users are inquiring as to the possibility of a steelvorkers' strike and wondering whether they should lay in a protective upply of wire.

Boston—After a rather slow start ollowing leveling off in wire demand ast month, May bookings are only lightly heavier. Orders are spotty nd follow consumption. Consumer nventories of finished wire are depleted and in scattered cases users re adding 30 days to inventory base.

Philadelphia—Inquiry for merchant wire products is on the buoyant side, ut demand for manufacturers wire still lags. Despite foreign competition, demand for wire nails is said o be "not too bad".

Cleveland—Seasonal pickup in demand for merchant wire products ontinues to be experienced. Farm requirements, plus active construction and building are reflected. Manufacturers wire requirements are reported a little better in spots, but generally demand is sluggish.

Pig Iron . . .

Pig Iron Prices, Page 146

Philadelphia—The drive for low-priced tonnage for the Chester, Pa., furnace continues. Offerings at $46 to $47 furnace, depending upon grade, are being made.

Should sufficient merchant tonnage be booked in addition to that for the furnace's affiliates at Harrisburg, Pa., and Phoenixville, Pa., to assure three months operation, the stack will go into operation in June. Much depends upon whether major district consumers can be lined up for substantial tonnages.

Foreign iron is being offered at lower prices.

New York—May business in pig iron is progressing at no faster rate than in April. Sellers anticipate no early improvement. They believe the trend will be downward over the next few months, reflecting summer vacation influences. This means, on the basis of the present outlook, that no real pick-up is likely to occur until after Labor Day.

Boston—Melt of basic pig iron is at a low point. Steelworks ingot operations are down and the leading

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That's why the World's Leading Producer of Stainless Steel Screws can sell you PREMIUM QUALITY AT "MARKET" PRICES.
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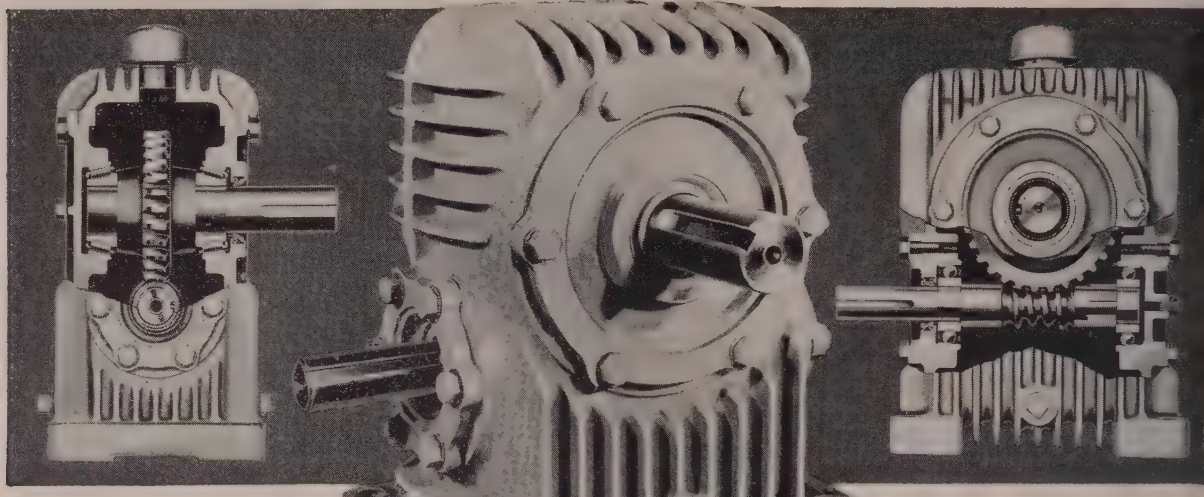

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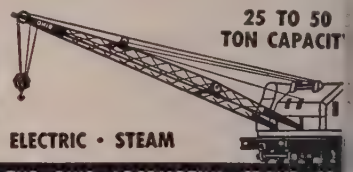

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This book brings together the combined knowledge and experience of 31 outstanding authorities and takes one step by step through steelmaking. Representing years and years of constant work and study, "ABC" is the result of actual first-hand experience. It is written in simple, non-technical language, and hundreds of photographs of operations and equipment are included. **The Penton Publishing Co., Book Department, 1213 W. 3rd. St., Cleveland 13, O.**

mechanical

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onsumer is operating largely on oreign iron. Close to 10,000 tons of oreign foundry iron for a cast pipe roducer in the Boston district rought close to $45 a ton, delivered oundry, including switching charges.

Foundry and malleable iron releases about match the shop melt, arely holding a 4-day per week chedule.

Cincinnati—Although there is no gnificant change in demand for pig on, foundry business appears to be little better in spots. This is particularly true of captive shops in the arm implement field.

The Globe Iron Co. and the Jackon Iron & Steel Co. have reduced he differential on silvery pig iron rom $1.50 to $1.

Chicago — Demand for merchant ig iron remains slow and unhanged. While a few foundries ote a strengthening in business. thers feel none. Foundries have let heir stocks of iron run low. Conequently, when they receive a modrate size order for castings they ave to ask for rush shipment of ron.

St. Louis—Pig iron production, at alf of capacity, is falling behind laily consumption. Grounds stocks f basic have dropped perhaps 25 er cent in the last 30 days, due argely to increased open-hearth furace operation.

Iron Ore . . .

Iron Ore Prices, Page 156

Cleveland—Iron ore shipments are ncreasing on the Great Lakes as the 1954 shipping season gets into full swing. Movement of ore from the ead of the lakes in the week ended May 10 totaled 2,076,663 gross tons, reports the Lake Superior Iron Ore Association. This was the heaviest weekly tonnage recorded so far this season, but it was 863,560 tons under movement in the like 1953 week.

Cumulative shipments in the 1954 shipping season to date now stand at 4,020,312 gross tons. This is more than 8 million tons under the 12,772,864 tons that had been moved in the 1953 season to May 10.

Stainless Steel . . .

Stainless Steel Prices, Page 146

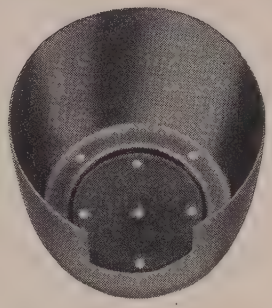
Pittsburgh—To benefit consumers of stainless steel in coils and to pass on economies resulting from technological improvements, U. S. Steel Corp. revised its stainless price structure last week. Revisions include changes in price bases and extras.

Net price changes for most popu-

Saved: $54,000 per year...

by converting from castings

to GEOMETRIC STAMPINGS



Stamping 57c

A large New England manufacturer called in Geometric engineers to study casting components of a new home appliance product. As a result the main casting shown above was converted to a stamping. Cost of the casting was $1.07, cost of the stamping only 57c—a savings of 50c on each part—or $54,000 saved per year.

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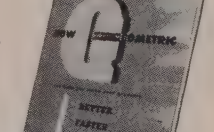

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GEOMETRIC STAMPING CO.

A Subsidiary of Barium Steel Corp.

1130 E. 200th Street Cleveland 17, Ohio

lar items range from 9½ cents per pound decrease to 5 cents per pound increase. Decreases cover grades and sizes produced by continuous cold reduction. Increases are in analyses and sizes which continue to be made on hand mills, the corporation announces.

Consumers who purchase sheets in coils rather than in cut lengths received a reduction. Price decreases amounting to 3.75 cents to 4.00 cents per pound are being made for some grades of stainless cold-rolled strip.

Structural Shapes . . .

Structural Shape Prices, Page 142

New York—Structural activity is being fairly sustained, with b'ds having recently gone in on a 1500-ton manufacturing building in Kingston, N. Y., for International Business Machines Corp. Several bridge projects are active and school work is being let, including a 630-ton h'gh school in Uniondale, Long Island, N. Y.

Standard shapes are readily available. Light flange sections are in tighter supply than the standard, but can be had without too much difficulty. Relatively, bearing piles and sheet piles are moving actively, reflecting particularly road and bridge work.

Boston — Structural fabricating shops have worked costs down to the bone. While still competitive, prices are steadier on most tonnage and frequently under engineers' estimates. Overtime has been generally eliminated.

More building construction is being estimated. While largely military or public work, contracts include 1000 tons, shop addition, Morgan Construction Co., Worcester, builder of steel mill equipment.

Philadelphia — Structural activity is marked by sharp competition. Fabricated steel prices are being slashed and various fabricators are going in for jobs that normally they wouldn't be inclined to figure.

Structural business is holding up at a better level than most lines, but fabricators' backlogs continue down sufficiently from the extended position of recent years to leave shops uneasy.

Chicago — Price competition for fabricated structural steel business is keen. Inquiries for material are numerous.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3200 tons, double cantilever maintenance hangar, airfield base, Abilene, Tex., to Mosher Steel Co., Dallas, Tex., through A. J. Rife Co., Dallas, general contractor; also reinforcing bars to Southwest Steel Co., Dallas.

630 tons, junior and senior high school, Uniondale, Long Island, N. Y., to Bethlehem Fabricators, Bethlehem, Pa.

235 tons, Dolphin county prison, Harrisburg, Pa., to Van Dorn Iron Works Co., Cleveland.

185 tons, auto parts sales building, Carlisle, Pa., to Goetz Welding Co., Harrisburg, Pa.

115 tons, structurals and bars, school building, Stoneham, Mass., to American Architectural Iron Co., Boston, and Concrete Steel Co., Boston, through G. L. Rugo & Sons Inc., Boston, general contractor.

100 tons, school building, Southington, Conn., to New Britain Iron Works, New Britain, Conn., through Hayes Construction Co., New Britain.

STRUCTURAL STEEL PENDING

1500 tons, manufacturing building, International Business Machines Corp., Kingston, N. Y., Turner Construction Co., engineer in charge; bids closed.

1430 tons state bridges, Orange county, New York; Carlo Bianchi Co., Boston, general contractor.

1000 tons, shop addition, Morgan Construction Co., Worcester, Mass.; E. J. Cross Co., Worcester, general contractor.

1000 tons, warehouse, Owens-Illinois Glass Co., Alton, Ill., bids May 24.

950 tons, two railroad bridges and relocation project, The Dalles dam, Columbia river (also 70 tons reinforcing); bids to U. S. Engineer, Portland, Oreg., June 8; Spec. 54-141.

800 tons, apartment, Wilmington, Del., bids May 19.

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Let us make your stamping problems our problems. Our Engineering Department has had many years of experience in development work and our production facilities include not only a modern press department, but facilities for copper hydrogen brazing and other types of welding and assembling work. We solicit your prints and inquiries.

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WHEELING STEEL CORPORATION
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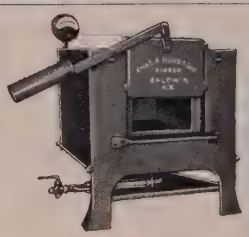
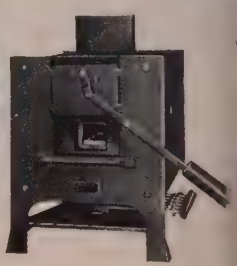
Atmospheric Pot Furnace 1650° F



Bench Type Oven Furnace 2000° F



High Speed Full Muffle Furnace 2400° F

WRITE TODAY FOR COMPLETE "*BUZZER*" CATALOG

CHARLES A. HONES, INC.
125 South Grand Avenue, Baldwin, L. I., N. Y.

15 tons, county courthouse annex, Worcester, Mass.; S. Volpe & Co., Inc., Boston, general contractor.
35 tons, control tower and building, Logan Airport, Boston, Groisser & Shlager Iron Works, Somerville, Mass., low on re-bid.
35 tons, also 160 tons reinforcing bars, Washington state highway bridge, Chelan county; general award to Paul Jarvis, Inc., Seattle, low $450,424.
30 tons, Gore Air Field hangar, Great Falls, Mont.; general contract to Hagstrom Construction Co., St. Paul, low $647.000 on one schedule.
00 tons, overhead pipe supports, Baraboo, Wis.; bids to Corps of Engineers, Milwaukee.
00 tons, maternity and X-ray building, hospital, Abington, Pa., May 20.
90 tons, two spans, Frankfort creek flood control, Philadelphia, May 27.

REINFORCING BARS . . .

REINFORCING BARS PLACED

00 tons, Sand Point bridge, Pend Oreille river, Idaho, also 40 tons ammunition storage, Fort Richardson, Alaska; to Bethlehem Pacific Coast Steel Corp., Seattle; Peter Kiewit Sons Co., Longview, Wash., general contractor.
50 tons, South junior high school, Brockton, Mass., to Northern Steel Inc., Medford, Mass., through Jefferson Construction Co., Cambridge, Mass., general contractor; fabricated structural steel to Builders Iron Works, Cambridge, Mass.
00 tons, soy bean elevator, Ralston Purina Co., Kansas City, Mo., to Sheffield Steel Co., Kansas City, through Jones-Hettelsater Construction Co., Kansas City, general contractor.
015 tons, state bridges, Brockton, Mass., Fall River expressway, to Truscon Steel Co.; D. V. Frione & Co. Inc., New Haven, Conn., general contractor.
270 tons, Larson Air Field garage, Moses Lake, Wash., to Soule Steel Co., Portland; Donald M. Drake Co., Portland, general contractor.
145 tons, Battell Hall building, state hospital, Norwich, Conn., to Scherer Steel Co., Hartford, Conn., through Wadhams & May Co., Hartford, general contractor.
115 tons, Bureau of Roads, Idaho, forest bridge, to unstated interest; Hansen & Parr Construction Co., Portland, general contractor, low $173,558.
80 tons, Memorial Hospital, Clarkston, Wash., to Truscon Steel Co., Portland; Brazier Construction Co., Seattle, general contractor, low $543,365.

REINFORCING BARS PENDING

600 tons, Turtle Creek pressure sewer, part 2, Dallas floodway; bids May 21, Corps of Engineers, Fort Worth, Tex.
200 tons, Idaho state highway bridges, Minidoka, Cassia and Badger counties; also 6000 feet steel shell piles; bids to Boise, May 25.
100 tons and miscellaneous 2495 feet 36 to 8 inch C. M. pipe, relocation project, Fulton Canyon, Oreg.; bids to U. S. Engineer, Portland, June 15.

PLATES . . .

PLATES PENDING

8195 tons, low carbon, plates and bars, Lima Ordnance Depot, Lima, O.; bids May 19, inv. 13B.
500 tons or more, three large and two small storage tanks, Mountain Home Air Base, Idaho; bids to U. S. Engineer, Walla Walla, Wash., advanced to May 19.
380 tons, ⅝-inch, 200 x 72, Navy, inv. 8069-B, Washington.
150 tons, Navy carbon steel hull, inv. 2-2033; bids May 20, Washington.

PIPE . . .

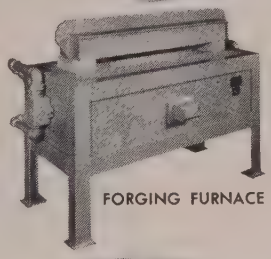
CAST IRON PIPE PLACED

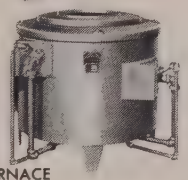
850 tons, 16 inch and smaller, system replacement, Pasco, Wash., to U. S. Pipe & Foundry Co., Seattle.
150 tons, various sizes, system expansion Omak, Wash., to U. S. Pipe & Foundry Co., Seattle.

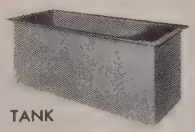
get the best out of your tool steel through

PROPER DRESSING

FORGING HAMMER


FORGING FURNACE


POT FURNACE


QUENCH TANK

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Here is a "Package" that will get rid of a costly and annoying problem . . . In fact, it will save up to 60% of costs for cutting and chipping tools . . . the best life is gotten out of today's steels through proper dressing . . . proper steel, properly treated, will reduce costs substantially. Now, at your own convenience, you can dress as many tools as are needed, and keep close control of your tool inventory.

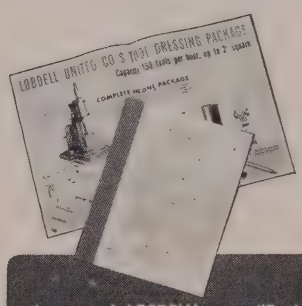
The complete "Tool Dressing Package", entirely engineered by LOBDELL UNITED CO., (subsidiary of United Engineering and Foundry Co.) . . . includes all of the Forging, Heat Treating and Dressing Equipment . . . plus, the practical methods needed . . . and this "Package" not only reduces inventory costs, but it can do this at *low initial cost*, recoverable nominally in one year . . . without special metallurgical control.

The "versatile" NAZEL Electro-Pneumatic Forging Hammer is the LOBDELL UNITED CO. product . . . For the additional equipment presented within this "Package", LOBDELL is joined by a group of the most reputable leaders in their fields:

Heating Equipment by Eclipse Fuel Engineering Company

Tool Grinding Equipment by Black and Decker Company

Accessory Tools and Tool Steels by Bedford Tool and Forge Company



A copy of LOBDELL's new "Tool Dressing Package" Bulletin will give you further details.

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ZRC (Zinc-rich Coating) rust-proofs iron and steel for years. Easy to apply — paint on or spray on — ZRC costs less than 1½¢ per sq. ft. of 100% corrosion protection.

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PITTSBURGH BEVEL "SAFE-HED" STAMPS
The dependable stamps for 90% of all steel stamping applications, and long, excellent service.

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Made for the toughest steel mill marking. Ideal for stamping on rails, billets, ingots, etc.

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Round face characters eliminate cracking and internal stress during stamping operation.

Write today, explaining your specific stamping problem. We'll send complete information, recommendations and literature . . . BULLETIN 104-A.

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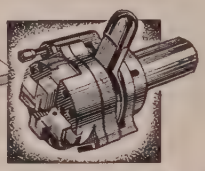
H&C Insert Chaser DIE HEADS



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HOT DIP GALVANIZING
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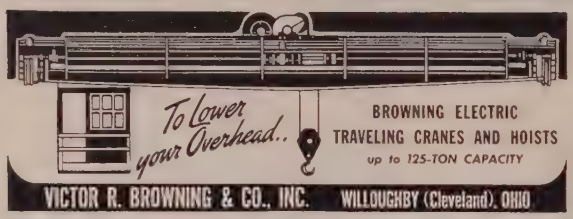
Phone: Re-9-8911 Philadelphia 25, Pa.



To Lower your Overhead..

BROWNING ELECTRIC TRAVELING CRANES AND HOISTS
up to 125-TON CAPACITY

VICTOR R. BROWNING & CO., INC. WILLOUGHBY (Cleveland), OHIO

The *Cleveland Steel Tool Co.*
• PUNCHES • DIES • CHISELS • RIVET SETS •
IF IT'S *RIVETED* YOU KNOW IT'S SAFE
WE FEATURE SPECIAL PUNCHES & DIES
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IF METALWORKING PLANTS ARE YOUR PROSPECTS . . .

STEEL can put you in touch with the important ones, those that do more than 92% of the industry's business. Tell the buyers and specifiers in these plants of the machines or materials you have for sale through an "Equipment—Materials" advertisement. For rates write STEEL, Penton Building, Cleveland 13, Ohio.

Bullish Sentiment Pushing Scrap Upward

Limited purchases of dealer grades at some points tend to give market appearance of strength. Buying generally is sluggish with steel operations holding steady

Scrap Prices, Page 168

Pittsburgh—Despite reduced trading, quoted prices rose again early last week, then showed signs of leveling off. No. 1 heavy melting is now . $29 to $30. With only a slight increase in steel production this month, trade sources don't expect a continued general advance in prices.

New York—Brokers have stepped up their buying prices on virtually all the steel grades, on the basis of moderate buying. They are now paying $17 to $18 for No. 1 heavy melting and No. 1 bundles, $15 to $16 for No. 2 heavy melting, and $13 to $14 for No. 2 bundles.

They have also boosted their offering prices for machine shop turnings to $5.50 to $6, mixed borings and short turnings to $7.50 to $8, low phos structurals and plate to $21 to $22, and short shovel turnings to $10 to $10.50.

Cast iron grades are unchanged, with No. 1 cupola moving steadily at $29 to $30.

Stainless steel scrap prices also are unchanged, with most activity centering around 18-8 sheets, clips and solids.

Philadelphia—While the major open-hearth grades of scrap are unchanged at the higher levels noted a week ago on the basis of continued buying by two district mills, prices on several other steel grades have advanced in light trading.

Electric furnace bundles are higher at $25, delivered consumer plant, mixed borings and turnings $15, short shovel turnings $17, low phos structurals and plate $29, and heavy turnings $22. Cast iron grades are steady.

Boston—Meager support to recovering steel scrap prices comes from New England consumers. Advances are predicated on larger consuming point buying. One district steelworks operating entirely on hot metal from scrap was down last week for the third time this year, while other area consumers are buying little or nothing. Higher prices hold for major heavy steel grades with No. 2 bundles up $2 per ton. Light steel scrap moves slowly and lags in the price recovery. Cast grades for the most part are unchanged on steady, but small-lot buying.

Chicago—Although steel mill operations in this district are at 80 per cent of capacity there is little new buying of scrap by mills. Most of the scrap moving is on old orders. Demand coming from brokers covering on old orders has pushed No. 2 heavy melting up $1, making that grade $28 to $29 to consumers. Rerolling rails advanced $1. Prices to consumers now range from $41 to $43. The increase stems from a decreasing supply of old rails. Because of reduced business on the railroads, they have cut their maintenance work and are not doing much rail replacement.

Youngstown—The scrap industry in this area is showing a lot of interest in what is happening elsewhere with some prices here apparently "talked up" as a result. However, there is very limited buying, especially by the big consumers. Most have enormous inventories and their home scrap and that brought in through reciprocal deals is keeping requirements well covered. In fact, one major steel plant reported it produced 8000 tons more scrap itself than its requirements in February.

Prices have advanced to about $27 to $28 for No. 1 heavy melting and No. 1 bundles, and $25 to $26 on No. 2 scrap and bundles.

Buffalo — Although steadier tendencies dominate the scrap market

(*Please turn to page* 170)

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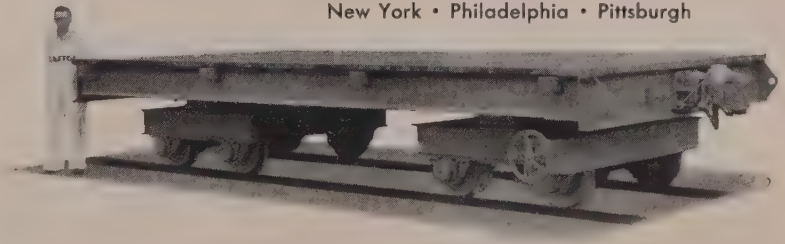


IRON AND STEEL SCRAP

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics

STEELMAKING SCRAP COMPOSITE

May 13	$27.67
May 6	27.33
Apr. Avg.	25.67
May, 1953	39.17
May, 1949	22.29

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	*26.00-27.00*
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*25.00-26.00*
No. 1 busheling	*29.00-30.00*
Machine shop turnings	*14.00-15.00*
Mixed borings, turnings	*14.00-15.00*
Short shovel turnings	19.00-20 00
Cast iron borings	19.00-20.00
Cut structurals	30.00-31.00
Heavy turnings	26.00-27.00
Punchings & plate scrap	*31.00-32.00*
Electric furnace bundles	31.00-32.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Charging box cast	33.00-34.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	24.00-25.00
No. 1 machinery cast	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	*32.00-33.00*
Rails, 2-ft. and under	44.00-45.00
Rails, 18-in. and under	45.00-46.00
Rails, random lengths	38.00-39.00
Railroad specialties	34.00-35.00

Stainless Steel Scrap

(F.o.b. shipping point)

18-8 bundles & solids	165.00-170.00
18-8 turnings	85.00-90.00
430 bundles & solids	65.00-70.00
430 turnings	50.00-52.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	*28.00-29.00*
No. 2 heavy melting	*24.00-25.00*
No. 1 bundles	*28.00-29.00*
No. 2 bundles	*21.00-22.00*
No. 1 busheling	*28.00-29.00*
Machine shop turnings	12.00-13 00
Mixed borings, turnings	16.00-17.00
Short shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Low phos.	26.00-27.00
Cut structural plate 2 ft and under	34.00-35.00
Alloy free, short shovel turnings	16.50-17.50
Electric furnace bundles	26.00-27.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Charging box cast	27.50-28.50
Stove plate	36.50-37.50
Heavy breakable cast	26.50-27.50
Unstripped motor blocks	25.50-26.50
Brake shoes	30.50-31.50
Clean auto cast	*43.00-44.00*
No. 1 wheels	33.50-34.50
Burnt cast	31.50-32.50
Drop broken machinery	*43.00-44.00*

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
R.R. malleable	41.00-42.00
Rails, 3-ft. and under	*44.00-45.00*
Rails, 18 in. and under	*47.00-48.00*
Rails, random lengths	*40.00-41.00*
Cast steel	34.00-35.00
Railroad specialties	35.00-36.00
Uncut tires	36.00-37.00
Angles, splice bars	*42.50-43.50*
Rails, rerolling	*42.00-43.00*

Stainless Steel

(F.o.b. shipping point)

18-8 bundles, solids	nom. 160.00-170.00
18-8 turnings	nom. 70.00-80.00
430 clips, bundles, solids	nom. 70.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	29.00-30.00
No. 2 bundles	22.00-23.00
Machine shop turnings	13.00-14.00
Short shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Low phos.	30.00-31.00
Electric furnace bundles	29.00-30.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	23.00
No. 2 heavy melting	21.00
No. 1 bundles	24.00
No. 2 bundles	19.00
No. 1 busheling	23.00
Electric furnace bundles	*25.00*
Machine shop turnings	12.00
Mixed borings, turnings	*15.00*
Short shovel turnings	*17.00*
Structurals & plate	*29.00*
Heavy turnings	*22.00*
Couplers, springs, wheels	31.00
Rail crops, 2 ft & under	41.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Malleable	39.00
Heavy breakable cast	36.50
Unstripped motor blocks	28.00*
Drop broken machinery	41.00

*Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*17.00-18.00*
No. 2 heavy melting	*15.00-16.00*
No. 1 bundles	*17.00-18.00*
No. 2 bundles	*13.00-14.00*
Machine shop turnings	*5.50-6.00*
Mixed borings, short turnings	*7.50-8.00*
Low phos. (structural & plate)	*21.00-22.00*
Short shovel turnings	*10.00-10.50*

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	21.00-22.00*

Stainless Steel

18-8 sheets, clips, solids	165.00-170.00
18-8 borings, turnings	70.00-75.00
430 sheets, clips, solids	40.00
410 sheets, clips, solids	30.00

*Nominal.

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	17.00-18.00
No. 2 heavy melting	15.25-16 00
No. 1 bundles	16.00-17.00
No. 2 bundles	*13.25-14.25*
Machine shop turnings	3.00-3.50
Mixed borings, turnings	5.50-6.00
Short shovel turnings	7.25-7.50
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	32.00-33.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	25.00-26.00
No. 2 bundles	19.00-20.00
No. 1 busheling	25.00-26.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	13.50-14.50
Short shovel turnings	13.50-14.50
Cast iron borings	13.50-14.50
Low phos., 18-in.	33.00-34.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	35.00
Charging box cast	35.00
Drop broken machinery	45.00

Railroad Scrap

No. 1 R.R., heavy melt.	29.00-30.00
Malleable	33.00-34.00
Rails, 18-in. and under	44.00-45.00
Rails, random lengths	37.00-38.00

CHICAGO

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	*28.00-29.00*
No. 1 factory bundles	31.00-32.00
No. 1 dealer bundles	29.00-30.00
No. 2 bundles	22.00-23.00
No. 1 busheling	30.00-31.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	13.00-14.00
Short shovel turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut structurals, 3-ft	32.00-33.00
Punchings & plate scrap	32.00-33.00
Electric furnace bundles	31.00-32.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Stove plate	34.00-36.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	40.00-42.00
Drop broken machinery	41.00-42.00

Railroad Scrap

No. 1 R.R., heavy melt.	31.50-32.50
R.R. malleable	40.00-42.00
Rails, 2-ft. and under	44.00-45.00
Rails, 18-in. and under	45.00-46.00
Angles, splice bars	36.00-38.00
Rails, rerolling	*41.00-43.00*

Stainless Steel Scrap

18-8 clips & solids	130.00-140.00
18-8 turnings	60.00
430 clips & solids	40.00-42.00
430 turnings	20.00-22.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*21.00*
No. 2 heavy melting	*19.00*
No. 1 bundles	*23.00*
No. 2 bundles	*19.00*
No. 1 busheling	21.50
Machine shop turnings	*10.00*
Mixed borings, turnings	*10.00*
Short shovel turnings	*11.50*
Punchings & plate scrap	24.00

Cast Iron Grades

No. 1 cupola	36.00
Charging box cast	27.00
Stove plate	29.00
Heavy breakable	26.00
Unstripped motor blocks	18.00
Clean auto cast	40.00
Malleable	28.00

BUFFALO

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	19.50-20.50
No. 1 bundles	25.00-26.00
No. 2 bundles	17.50-18.50
No. 1 busheling	20.50-21.50
Machine shop turnings	14.00-15.00
Mixed borings, turnings	16.50-17.00
Short shovel turnings	17.50-18.00
Cast iron borings	16.50-17.00
Low phos.	27.50-28.50

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	40.00-41.00

Railroad Scrap

Rails, random lengths	33.00-34.00
Rails, 3-ft and under	40.00-41.00
Railroad specialties	34.50-35.50

BIRMINGHAM

No. 1 heavy melting	19.00-20.00
No. 2 heavy melting	*22.00-23.00*
No. 1 bundles	19.00-20.00
No. 2 bundles	15.00-16.00
No. 1 busheling	19.00-20.00
Cast iron borings	13.00-14.00
Short shovel turnings	14.00-15.00
Machine shop turnings	12.00-13.00
Electric furnace bundles	25.00-26.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*42.00-43.00*
Charging box cast	28.00-29.00
Stove plate	*39.00-40.00*
Bar crops and plate	28.00-29.00
Structural, plate 2 ft.	28.00-29.00
Heavy breakable cast	28.00-29.00
Unstripped motor blocks	32.00-33.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	26.00-27.00
Rails, 18-in. and under	39.00-40.00
Rails, random lengths	34.00-35.00
Rails, rerolling	34.00-35.00
Angles, splice bars	36.00-37.00
Stand. steel axles	35.00-36.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	25.5
No. 2 heavy melting	24.5
No. 1 bundles	25.5
No. 2 bundles	*20.2*
Machine shop turnings	12.0
Short shovel turnings	14.0

Cast Iron Grades

No. 1 cupola	37.0
Charging box cast	27.0
Heavy breakable cast	*29.0*
Unstripped motor blocks	27.0
Brake shoes	30.0
Clean auto cast	39.0
Stove plate	30.0

Railroad Scrap

No. 1 R.R. heavy melt.	*30.0*
Rails, 18-in. and under	*41.0*
Rails, random lengths	*38.0*
Rails, rerolling	*42.5*
Uncut tires	30.0
Angles, splice bars	33.0

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	23.0
No. 2 heavy melting	19.0
No. 1 bundles	21.0
No. 2 bundles	16.0
No. 3 bundles	13.0
Machine shop turnings	11.5
Mixed borings, turnings	11.5
Short shovel turnings	11.5
Electric furnace, No. 1	35.0

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	30.00-35.0
Heavy breakable cast	25.0
Unstripped motor blocks	23.0
No. 1 wheels	21.0
Stove plate (f.o.b. plant)	28.0
Brake shoes	28.0

Railroad Scrap (Delivered consumer plant)

Rails, random lengths	30.00-34.0

SAN FRANCISCO

No. 1 heavy melting	20.0
No. 2 heavy melting	16.0
No. 1 bundles	19.0
No. 2 bundles	16.0
No. 1 busheling	20.0
Machine shop turnings	5.0
Mixed borings, turnings	5.0
Short shovel turnings	9.0
Cast iron borings	9.0
Cut structurals	25.0
Heavy turnings	9.0
Punchings & plate scrap	25.0
Electric furnace bundles	19.0

Cast Iron Grades

No. 1 cupola	*39.00-41.*
Charging box cast	35.
Stove plate	37.
Heavy breakable cast	36.
Unstripped motor blocks	29.
Brake shoes	35.
Clean auto cast	39.
No. 1 wheels	39.
Burnt cast	23.
Drop broken machinery	43.

LOS ANGELES

No. 1 heavy melting	20.
No. 2 heavy melting	16.
No. 1 bundles	18.
No. 2 bundles	14.
Machine shop turnings	5.

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	40.

HAMILTON, ONT.

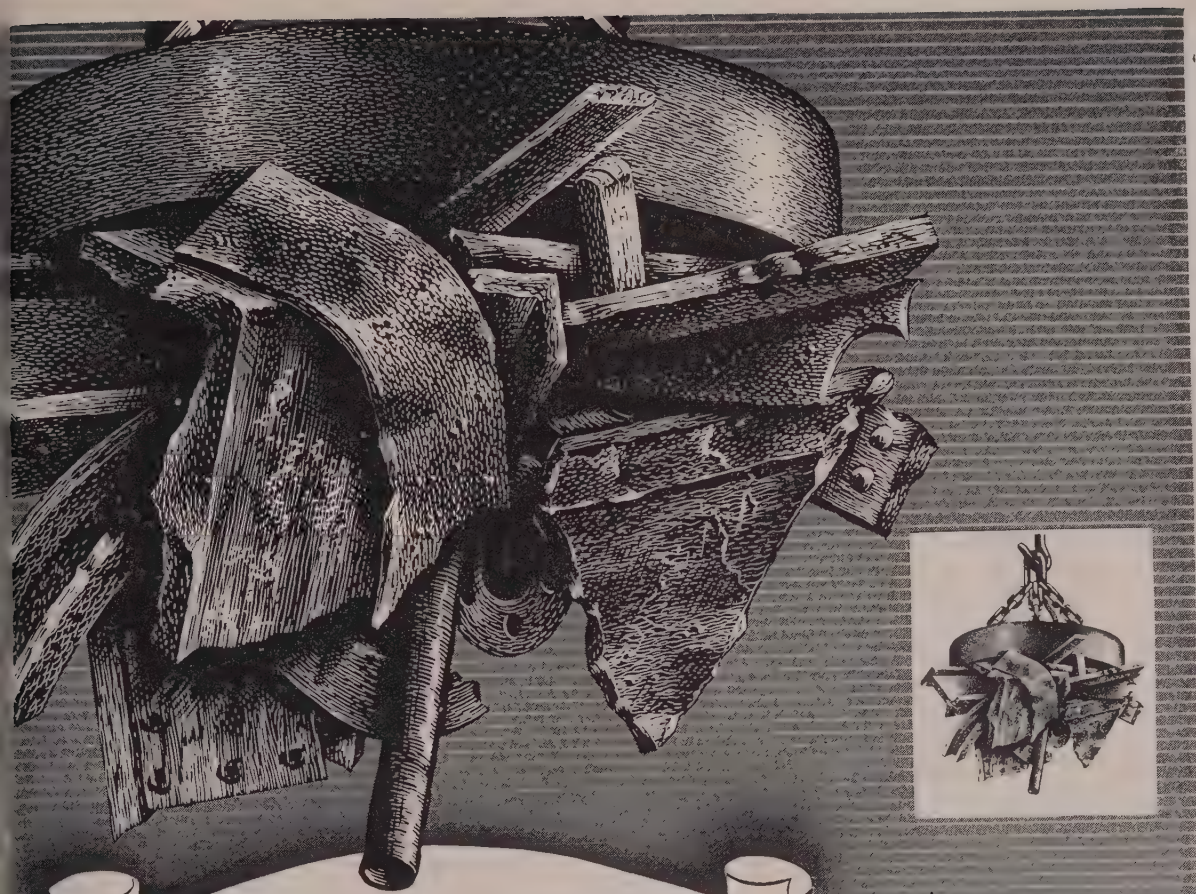
(Delivered prices)

No. 1 heavy melting	$22
No. 2 heavy melting	19
No. 1 bundles	22
No. 2 bundles	17
Mixed steel scrap	16
Mixed borings, turnings	12
Rails, remelting	32
Busheling, new factory: Prepared	20
Unprepared	16
Short steel turnings	12

Cast Iron Grades†

No. 1 machinery cast	42.00-43

†F.o.b., shipping point.



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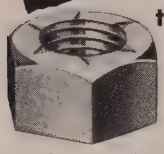

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(*Concluded from page* 167)

dealers' optimism is restrained by lack of buying by leading mill consumers. Reports of strength in other areas is a stimulating factor. Yard stocks are increasing.

Cleveland — Substantial tonnage purchase by one mill in this district raised steelmaking scrap another $2 per ton here with No. 1 heavy melting now being quoted $28 to $29. Various railroad items also have been advanced $1, and a couple cast items also are quoted up $1.

For the most part the bullishness in the market is based largely on sentiment. Some brokers and dealers think the current show of strength is only a flash-in-the-pan. Except for the one mill purchase, little business of representative character is reported. Important market factors would not be surprised if prices receded $1 or so shortly unless much more active demand develops.

Steelmaking operations have been rising here the past few weeks and the district ingot rate now stands at 78 per cent of capacity.

Detroit—Continued active demand in the motor city bolstered scrap prices still further last week and observers who had written the move off as a flurry now figure the firming may last through spring. More companies are adding their bit to demand, tending to confirm the judgment that some had been waiting for the bottom to be reached before purchasing. Now they are laying in scrap against further rise.

St. Louis — Scrap market is strengthening in spotty fashion, led by short and rerolling rails. They are up $1 to $2. Heavy breakable cast also lifted $2 under stimulus of a single large order in an otherwise dead foundry market. Rails continue in decreasing supply as the roads cut back maintenance.

Occasional price firmness has boosted yard receipts mildly. Brokers have been hoping for a general pickup in scrap demand, but feel what is developing now definitely is not it. Mills are showing a bit more interest in heavy melting steel and bundles.

Cincinnati—Prices are steady in the scrap market here.

San Francisco—No. 1 cupola cast advanced $2 a ton on some deliveries. Sales were reported last week at $41, which compares with $39 which had previously prevailed for some months past.

Los Angeles—Mill demand is slug-

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Samoset, Rockland, Me.

gh, although one dealer reported a table purchase of No. 2 bundles at 5 delivered.

Birmingham—The district's scrap market showed further strength this week with No. 2 heavy melting quoting $22 to $23; stove plate, $39 to $40, and No. 1 cupola cast, $42 to $43.

Seattle—There is little interest in scrap. Buyers hold good inventories and are purchasing only sufficient to cover consumption. In some instances inventories are being allowed to dwindle. Supplies of all grades are ample.

Ship More Steel in March

New York—Direct shipments of finished steel totaled 5,583,690 net tons during March, an increase of over 300,000 tons from February, reports the American Iron & Steel Institute. Among the market classifications which received higher shipments were the construction and contractors products category, warehouses and containers.

Rails, Cars . . .

Track Material Prices, Page 145

Chicago — Demand for railroad rails and track accessories is down. Some railroads are reducing their tracklaying programs.

Tubular Goods . . .

Tubular Goods Prices, Page 145

Pittsburgh—Demand is firm for oil country tubular goods, although increased competition is seen in third quarter. Seamless tubular specialties, mechanical and pressure tubing face heavy competition with no likelihood of improvement this month. Production slowdowns are taking place among tubemakers.

Boston—Seamless pipe orders are relatively better than for buttweld and other tubular products, but distributors are buying sparingly, little beyond replacement. Merchant steel pipe prices at secondary level are soft. Deliveries are prompt, a matter of days when orders can be filled from stock.

San Francisco—About 17 miles of secondhand drill pipe is being offered for sale by Standard Oil Co. of California at its supply depot in Taft, Calif.

Seattle — Cast iron pipe awards last week totaled 1000 tons for system improvements in eastern Washington cities.

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Positions Wanted

AVAILABLE FOR EMPLOYMENT as officer or consultant to corporation in ferroalloys, steel, iron, nonferrous, chemical industry. Resigned top level management position in medium size corporation. Twenty years in management of four national corporations, with broad experience in operations, research and development, sales, marketing, industrial relations, purchasing, engineering. Authority on chrome and manganese ores-sources, prices, selection, use in ferroalloys and steel manufacture. Authority on sources, prices, use of domestic and foreign raw materials in manufacture of Silicon Metal and all ferrosilicon alloys, Chromium Metal and all ferrochrome alloys, Manganese Metal and all ferromanganese and silico-manganese alloys, calcium, rare earths, boron, tungsten, columbium, ferrotitanium, some aluminum and magnesium alloys, calcium carbide, acetylene generation, lime burning, coke processing, ferroalloy briquets. Broad experience metallurgical plant layout, labor saving devices, design and use of various types of open and closed top submerged arc and open arc electric furnaces, material handling equipment. Developed numerous electrometallurgical processes, some products having recently attained major importance in aluminum, steel, and chemical industries. Patents, trade-marks. Many contacts and ideas for new products to serve these industries. Seasoned job evaluation and labor contract negotiator. Experienced Washington representative with contacts. Available for domestic and foreign assignments. Registered Professional Engineer-Ohio. Age-41. Address Box 965, STEEL, Penton Building, Cleveland 13, Ohio.

EXPERIENCED STAFF MAN AVAILABLE to serve plant management for improved steel quality, production planning, processing and/or manufacturing cost reduction. Capable, with proven record to direct steel production operations and flat rolling conversions with safe, profitable, customer service leadership. Reply Box 967, STEEL, Penton Building, Cleveland 13, Ohio.

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Mechanical engineer with experience in design, installation, modification of machinery and equipment processing methods, plant layout. Rolling mill experience preferred.

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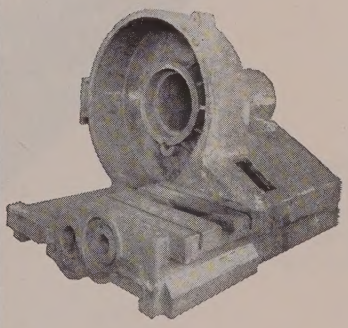
RED CIRCLE Rolls ALLOY-CHILLED

Gray Iron Castings

Castings of any size up to 80,000 pounds. Hyde Park facilities are equal to your every requirement



Machine Castings
Lathe Beds
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Pinion Housings
Mill Housings
Shoe Plates
Layout Plates
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Hyde Park

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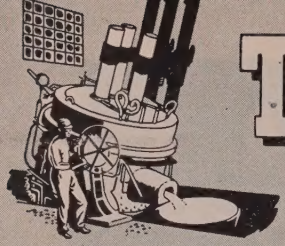

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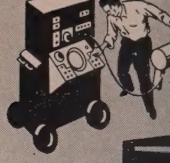
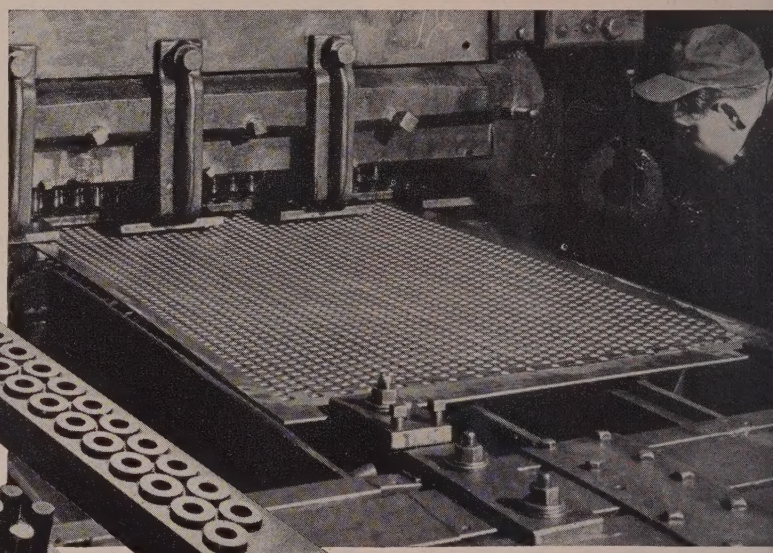
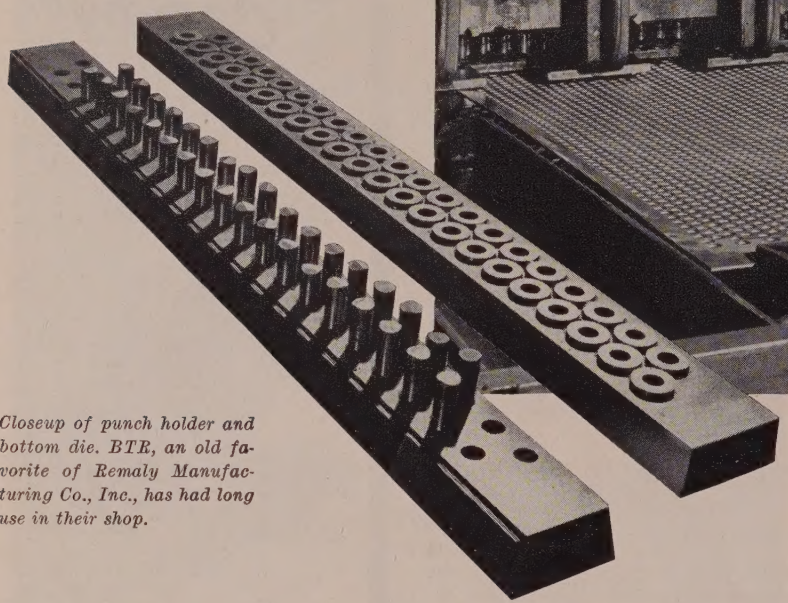


BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corp

BTR Die can simultaneously punch 39 holes 13/16 in. in diameter in 36-in. carbon-steel plate as it stamps screen segment for coal producer.





Closeup of punch holder and bottom die. BTR, an old favorite of Remaly Manufacturing Co., Inc., has had long use in their shop.

Dies made of BTR take big bites in making screens for coal producer

It's interesting to watch some of the operations performed in the shop of the Remaly Manufacturing Co., Inc., Tamaqua, Pa. For example, here's a typical job handled by this 90-year-old firm. They rig up a punch holder and dies in a 900-ton press, feed in 6-gage carbon steel plate, or sometimes stainless, or manganese-bronze. Then, Boom! Boom! Boom! In less time than it takes to tell, they've punched a large screen segment for use in sizing anthracite coal.

What steel do they use for the dies? It's Bethlehem BTR, an old standby with Remaly. One day we asked them what they liked best about BTR for making screen segments. Wear-resistance? Shock-resistance? Low distortion? Good machinability? Fast, easy heat-treatment? "It's hard to put a finger on any one of those points and say it's best," answered Bill Yost, one of the heads of the firm. "In our shop, we like BTR on all counts. It stands up well. In fact, I can't remember ever having trouble with it."

BTR (Bethlehem Tool Room) is our general purpose, manganese-chromium-tungsten grade of oil-hardening tool steel. Its outstanding characteristic is its safe-hardening property. It has the happy combination of abrasion-resistance and toughness, making it an ideal steel for tool-and-die applications where long wear is essential.

Your nearest Bethlehem tool steel distributor has a good stock of BTR on hand and is at your service. Give him a call at your first opportunity.

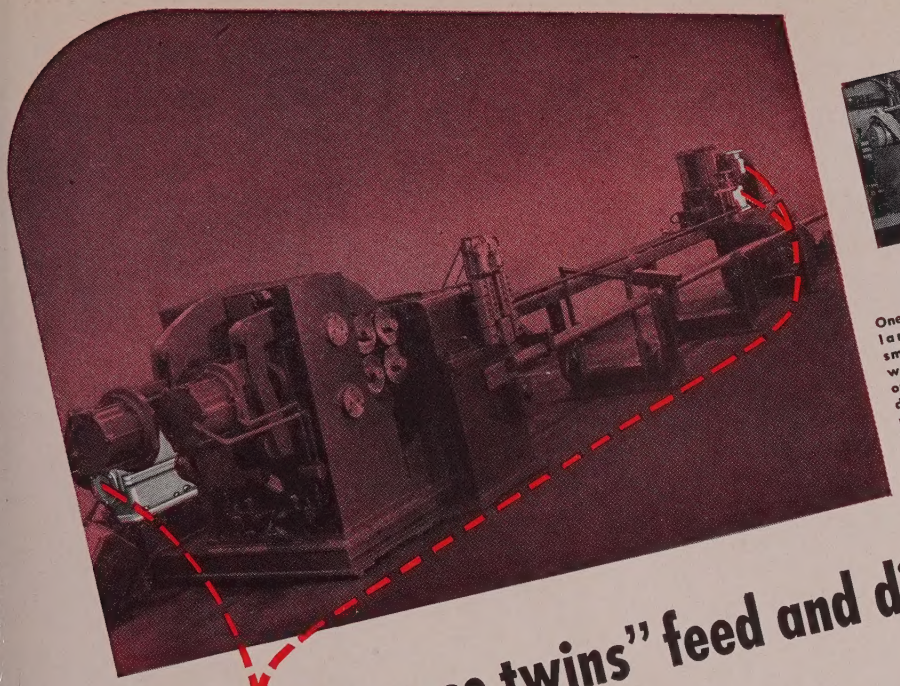
BETHLEHEM TOOL STE ENGINEER SAYS:

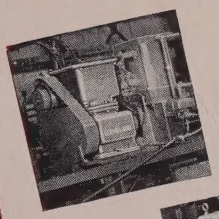
Don't Punch A the Way Throu

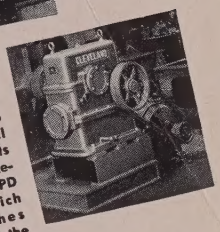
The tool life of punches can be gre improved by proper control of the st of the punch. It is not necessary f punch to go completely through the being punched, for when it does, r wear occurs. The wear increases c ance, which in turn increases the necessary for punching and also re in burred edges.

When a punch has penetrated part through the stock, "snapping" occurs the "button" pops out. How far the pu penetrates before snapping takes p depends upon the material being pun and the thickness of the stock. Gener the softer the material the greater the etration required. Conversely, a har brittle material requires less penetra

Penetration on soft, thin stock ma as high as 90 pct of the stock thick and on hard, thick stock, as low as 40 The less penetration required to brin the button, the better. What the pen tion should be must be determined pirically on each job. Control of p penetration by adjusting the press s means decreased punch-wear, better ity parts and increased tool life.







One large Cleveland and two smaller vertical worm gear units operate this Medart No. 3 RFPD machine which cold-finishes steel bars at the rate of 12 feet per minute.

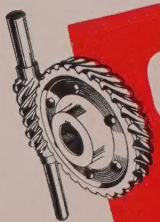
CLEVELAND "Siamese twins" feed and discharge bars

HEART of the feed and discharge mechanism of this Medart Centerless Bar Turner is a trio of Cleveland worm gear speed reducers. One large Cleveland unit drives cold-finished bars through the cutterhead. The "Siamese twins", two Cleveland vertical units mounted head-to-head, pull the workpiece back at speeds of 3 to 12 feet per minute and then return the carriage at 75 feet per minute for a new workpiece.

This unique installation demonstrates again how Cleveland vertical and right-angle drives save valuable space and streamline machine design. Functional design is just one Cleveland advantage. Another is Cleveland's dependability and long wear. Sliding action of case-hardened steel worm on nickel-bronze gear transmits power with a smooth, uninterrupted torque flow.

For the best in worm gear drives, get those made by a worm gear specialist: Specify Cleveland! Write for free Catalog 400. The Cleveland Worm and Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

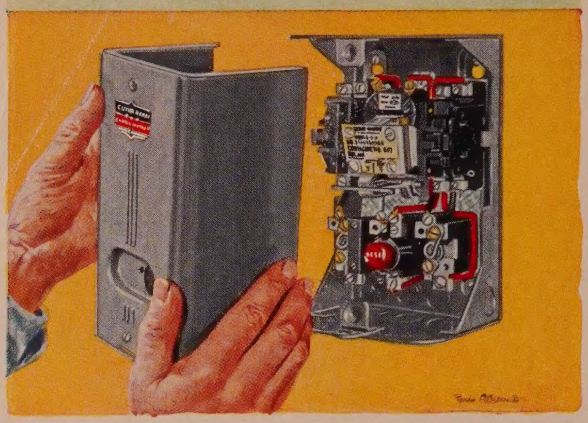


CLEVELAND
Worm Gear
Speed Reducers

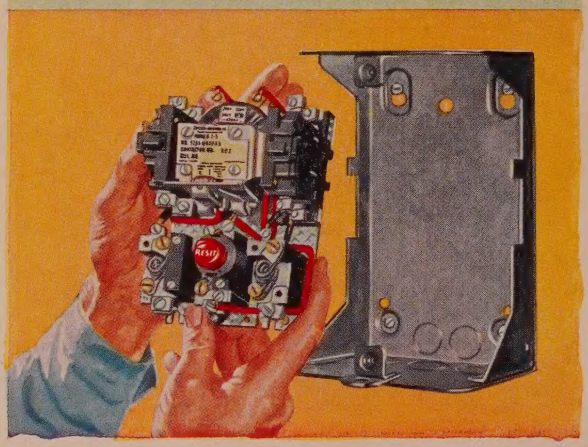
THE THREE CUTLER-HAMMER STARS ★ ★ ★ STAND FOR THREE NEW STANDARDS

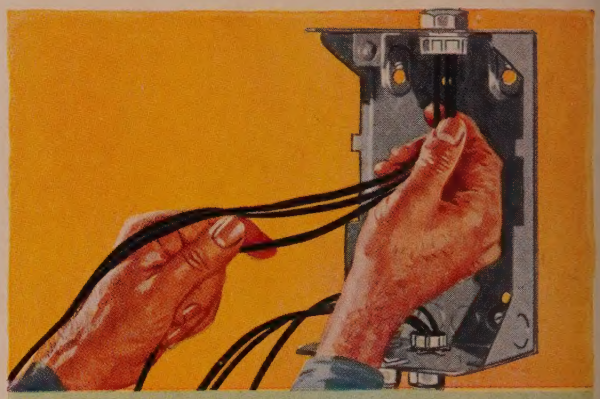
☆ installs easier
☆ works better
☆ lasts longer

1. Just loosen two screws . . . and off comes wrap-around cover. Screws *stay* in cover, do not fall into machines or get lost on floor; a typical time-saving design detail.

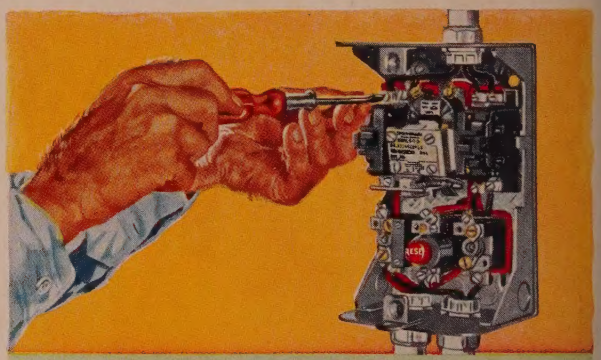


2. Remove entire starter mechanism . . . by merely loosening three screws. Then light, easy-to-handle skeleton case can be installed. Embossed mounts for good job on uneven surfaces. And upper mounting holes are keyhole slotted.





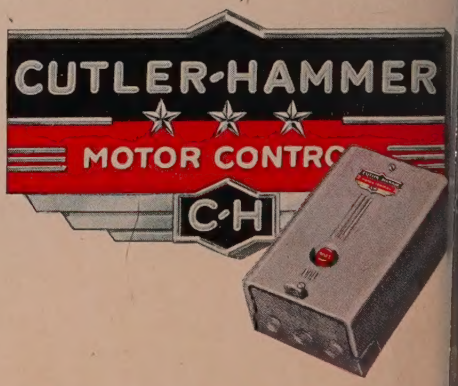
3. Pull in wires . . . Making conduit connections and pulling wires is a cinch. No starter mechanism or side walls of case in the way. No skinned knuckles or damaged starters.



4. Connect up and go . . . Straight-through wiring; all line terminals at top, load terminals at bottom. All terminals are clearly marked and visible from front. Pressure connectors throughout. All panel wiring is color coded.

Factory records everywhere today show the cost of installing motor control is almost always greater than the cost of the equipment, often two to three times as much. That is why Cutler-Hammer engineering made easier installation a key objective in designing the new Cutler-Hammer ☆ ☆ ☆ Motor Control. When you buy motor control, figure its *real* cost, its installed cost. Then you too will insist on Cutler-Hammer! Your nearby Cutler-Hammer Authorized Distributor is ready to serve your needs. Order from him today.

CUTLER-HAMMER, Inc., 1211 St. Paul Ave.. Milwaukee 1, Wis.



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